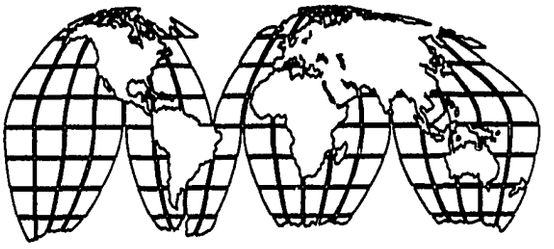
USAID Working Paper No. 189

Center for Development Information and Evaluation



Protecting Biological Diversity: *Madagascar Case Study*

October 1994

U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT

PN-ABT-452

USAID Working Paper No. 189

Protecting Biological Diversity: *Madagascar Case Study*

---

by

Fred Sowers, Team Leader
Natural Resources Policy Specialist
Labat-Anderson, Inc.

Karen McKay
Social Forestry Specialist
Development Alternatives Inc.

Raymond Daviesson
Biodiversity Specialist
Development Alternatives Inc.

Lala Ranarinjanahary
Anthropologist

Agency for International Development
Center for Development Information and Evaluation

October 1994

This Working Paper is one of a number of case studies prepared for CDIE's assessment of USAID Protecting Biological Diversity programs. As an interim report, it provides the data from which the assessment synthesis is drawn. Working Papers are not formally published and distributed, but interested readers can obtain a copy from the DISC.

TABLE OF CONTENTS

FOREWORD

USAID's Center for Development Information and Evaluation (CDIE) is currently conducting a series of assessments of Agency programs directly related to its environmental strategy. This case study contributes to a global assessment of USAID-supported activities in protecting biological diversity conservation through strengthening parks and protected areas.

This field study which examines biodiversity conservation in Madagascar is one of six country case studies. Similar studies have been completed in Sri Lanka, Thailand and Nepal with work in Latin America remaining. The results of the six case studies, all of which follow a similar analytic framework, will be synthesized into an overall assessment that summarizes lessons learned from a global perspective, and highlights for USAID management the program implications of those lessons.

****

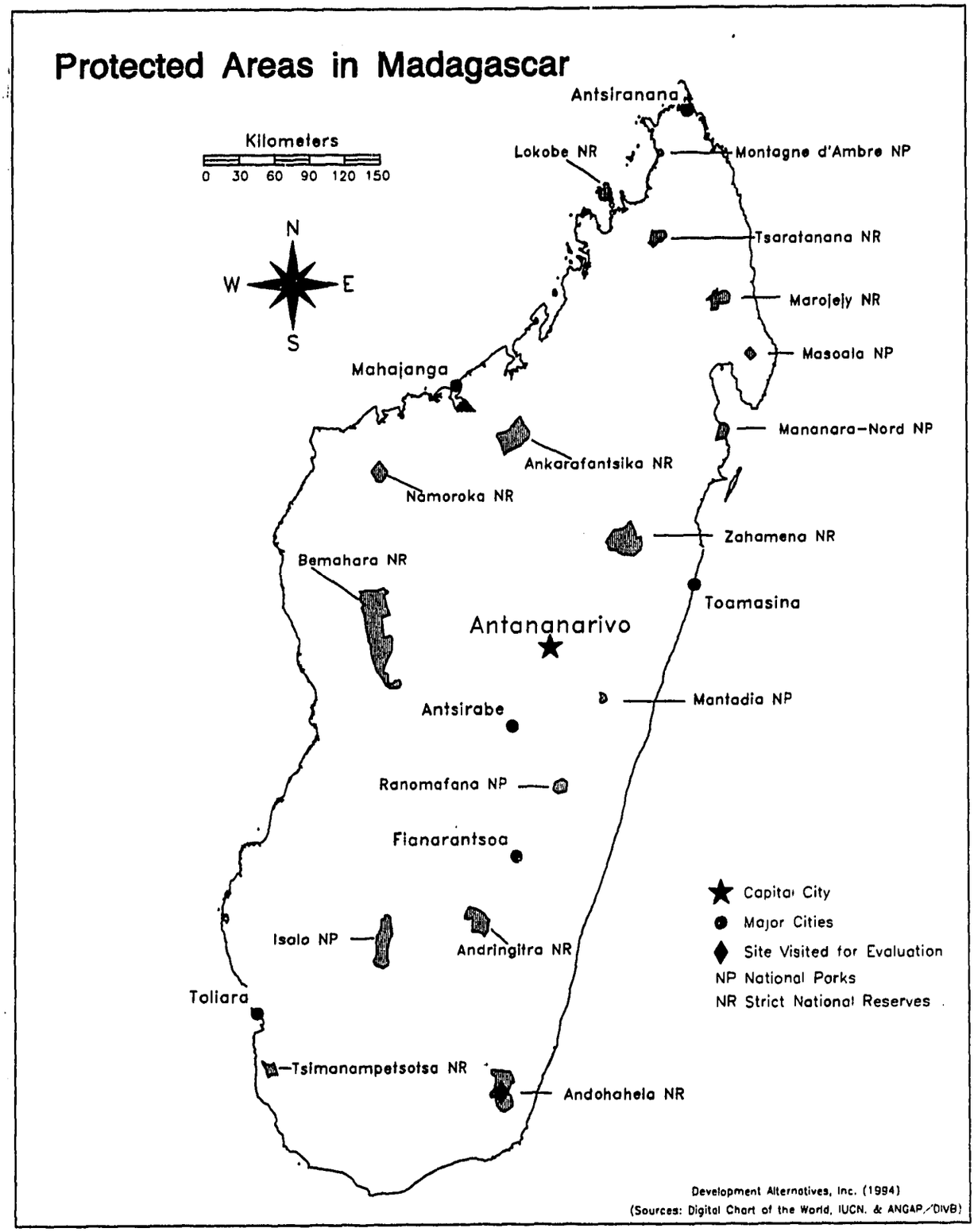
The team wishes to thank all those individuals who gave so generously of their time during the assessment. We feel privileged to have had the opportunity to meet with such knowledgeable and dedicated people. We hope that our efforts, in however small a way, assist them in ensuring that Madagascar's treasures -- its people and its environment -- are valued and appreciated for many generations to come.

GLOSSARY*

ANGAP	National Association for the Management of Protected Areas
ANAE	National Association of Environmental Action
APN	Agent for the Protection of Nature
ASOS	Action Sante et Organisation de Secours
CAG	Conservation Action Grant
CDIE	Center for Development Information and Evaluation
COMODE	Coouncil of Malagasy NGOs for Development and the Environment
DEF	Directorate of Water and Forestry
EP-1	Environmental Program - Phase 1
GMU	Grants Management Unit
GOM	Government of Madagascar
ICDP	Integrated Conservation and Development Project
KASTI	Komitin 'ny Ala Sy Ny Tontolo Jainana (Committee for the Forest and the Environment)
KEPEM	Knowledge and Effective Policies for Environmental Management
NEAP	National Environmental Action Plan
NGO	Non-Governmental Organization
NRMS	Natural Resources Management Support Project (USAID)
ONE	National Office of Environment
PVO	Private and Voluntary Organization
RNI	Reserve Naturelle Integree
SAFAFI	Malagasy NGO
SAVEM	Sustainable and Viable Environmental Management Project (USAID)
USAID	United States Agency for International Development

VSF	Veterinarians without Borders
WCS	World Conservation Society
WWF	World Wide Fund for Nature

* Acronyms are for french name equivalents.


Protected Areas in Madagascar
Kilometers
0 30 60 90 120 150
N
W
E
S
Antsiranana
Lokobe NR
Montagne d'Ambre NP
Tsaratanana NR
Marojejy NR
Masoala NP
Mahajanga
Mananara-Nord NP
Ankarafantsika NR
Namoroka NR
Zahamena NR
Bemahara NR
Toamasina
Antananarivo
Mantadia NP
Antsirabe
Ranomafana NP
Fianarantsoa
Isalo NP
Andringitra NR
Toliara
Tsimanampetsotsa NR
Andohahela NR
Capital City
Major Cities
Site Visited for Evaluation
NP National Parks
NR Strict National Reserves
Development Alternatives, Inc. (1994)
(Sources: Digital Chart of the World, IUCN. & ANGAP/DIVB)

1. INTRODUCTION

Madagascar, the world's fourth largest island, is virtually a continent unto itself. Approximately eighty percent of its plant life and over ninety percent of its animal species are found nowhere else in the world, and the reconnaissance of the country's biological diversity is just beginning. Neither African nor Asian, its people are as unique and varied as the island's extraordinary flora and fauna. Despite its historical, cultural and biological richness, the country struggles to reverse a rapid spiral of economic stagnation, poverty and environmental degradation.

This struggle encompasses a concerted bid to conserve the nation's biological heritage. In this evaluation, CDIE examines the changes introduced by USAID's assistance to Madagascar's program to protect the country's biological diversity. The USAID approach, which assumes an essential linkage between conservation of natural resources and socio-economic development, attempts to create enabling policy and institutional conditions while simultaneously supporting conservation and development programs in and around a variety of specific parks and protected areas. The goal of USAID's support is to establish sustainable human and natural ecosystems where the country's diverse biological resources are most threatened.

Since independence in 1960, Madagascar has gone through a succession of political regimes that have left their mark on the environment. The first government's natural resource policies followed the colonial practices of forest protection and state control through use permits and policing. Beginning in the mid-1970s, however, a radical change of government brought with it radical changes of policy. Although many parks, nature reserves, and public forests existed on paper and a forestry cadre had been trained to protect these areas, state efforts to actually manage its forest reserves were generally abandoned. Absolute conservation of forests was seen as anti-development and anti-people, an undesirable vestige of the colonial inheritance. In fact, government laxity and, in some cases, complicity hastened forest degradation. In its extreme form, forest burning and cutting became a form of civil protest. In some cases, undercompensated forest guards were driven to exploit forests for their own well-being.

Changes began to take place in the mid-1980s as both the Malagasy government and the world community came to appreciate the value of the resources at stake. The National Charter recognized a linkage between conservation and development. With support from the World Wildlife Fund for Nature (WWF) which had been in the country since 1979, the Madagascar government held a major conference to set out a program to reorient its environmental

policies and activities and to encourage outside donors to become involved in conserving Madagascar's unique natural heritage.

Undertaken in 1986, the first nationwide survey of the existing network of protected areas documented known resources and suggested improvements in the system (Nicoll and Landgrand 1989). This was followed over the next three years by the drafting of a National Environmental Action Plan for Madagascar (NEAP). The NEAP, adopted in 1988 and formally approved in 1990, was widely supported by the donor community. It emphasized a program to improve protected area management. Concurrent with these developments at the central level, the country launched a first generation of "conservation through development" projects in the field. USAID took an important role in supporting both the policy and institutional changes and the field level implementation.

Evaluation Approach

The Center for Development Information and Evaluation (CDIE) conducted field work, in late 1993, in Madagascar to gather data on the impact of USAID/Madagascar biodiversity conservation projects as part of a series of global Assessments of USAID Environmental Programs. The Assessment of Biodiversity Protection Programs responds to Agency interest in the impact and performance of its growing worldwide portfolio of environmental and natural resources management projects. The Madagascar case is one of six case studies examining USAID support for the preservation of critical habitats in park and protected area systems. CDIE developed a common methodology to facilitate cross-case analysis. The presentation in this report assumes a familiarity with the methodology which is summarized in Appendix A.

Conservation of biodiversity is a relatively recent area of focus in USAID's field programs, and, as a consequence, CDIE's assessment takes a more exploratory character than is typical for program assessments. The case studies in the biodiversity conservation series therefore, stress implementation strategies and the changes they have introduced rather than program impact. This evaluation approach is justified in that programs to strengthen biodiversity represent an area of increasing investment combined with scarcity of performance reporting.

Madagascar represents USAID's largest recipient of support for the conservation of biodiversity. "SAVEM" and "KEPEM", two of the Agency's ten largest biodiversity projects, comprise the core of the approximately $100 million USAID Madagascar natural resource/ biodiversity portfolio and address an overall problem that might be characterized as follows:

> The island has been identified as one of the "seven major centers of world biodiversity, and has been called the

> number one conservation priority in the world" (IUCN 1991). However, Madagascar's rich inheritance of biologically diverse natural resources is threatened by the consumptive expansion of traditional production systems. The resulting loss of forest cover, estimated at 80 to 85 percent, has been massive, rendering it a major challenge to identify and preserve remaining critical forest habitats and to integrate them into the surrounding cultural milieu in a sound and sustainable manner.

Early support to biodiversity conservation has lead USAID to elaborate a program which tests the hypothesis that "local populations will alter their behavior from destruction to conservation if they see a relationship between their economic and social well-being to the conserved area, and if they are empowered to make the right decisions" (USAID 1990). The result is a series of so-called "integrated conservation and development projects," or ICDPs, which attempt to achieve conservation through development of the peripheral zones surrounding protected areas. Because implementation of this assistance, and thus the testing of this hypothesis, are still in their early stages, CDIE concentrated its evaluation efforts on the program elements that had or were beginning to affect conservation practices at the field level.

CDIE's approach to the fieldwork in Madagascar combined an examination of changed and changing conditions at the national policy, planning and institutional levels with a more in-depth evaluation of one case where a site-specific protected area program has been operating. The evaluation thus considers USAID support to both national level and a specific local level conservation and development project designed to preserve biodiversity in the Andohahela Integral Natural Reserve. Certain unique features notwithstanding, Andohahela reflects the general evolution of Madagascar's approach to integrating conservation and development in its protected area programs. Such "Integrated Conservation and Development Projects" (ICDPs) do not exist in a vacuum, and the establishment of a supportive policy and institutional context has already received USAID support through a number of funding mechanisms.

The team spent four weeks in country collecting data related to the above program components. The team spent over one week in the environs of the Andohahela Integral Natural Reserve. Brief trips were made to two other field sites. The remainder of the time was in Antananarivo and its surroundings. Data collection methods included key informant, focus group and informal interviews, direct observation and analysis of secondary sources.

This report is divided into seven sections. The present introduction is followed by Section 2 which elaborates the general problem defined above and summarizes USAID's approach to solving it.

Section 3, the evaluation findings on program implementation, focusses on the strategy and outcome of activities associated with institutional support to the NEAP and grant support to field level operators. Section 4 outlines the initial impact of the program while section 5 assesses the program according to the four performance criteria presented in Appendix A. The sixth section highlights the lessons learned from USAID's experience in this area, and a final section is devoted to outstanding issues, or major problems that have yet to be resolved. A detailed discussion of CDIE's methodology can be found in Appendix A. Additional appendices and a bibliography supplement and expand upon the material contained in the main body of the report, in particular with regard to biodiversity conservation efforts in Madagascar and Andohahela Integrated Natural Reserve.

2. BACKGROUND

The Problem

Madagascar's rich inheritance of biologically diverse resources is threatened by widespread environmental destruction and deforestation that are often linked to the expansion of traditional production systems. Although there is no agreement on the original extent of forest cover, optimistic figures rate Madagascar's remaining forest cover at 20 percent. Estimates of deforestation rates vary. In 1981, the FAO postulated an annual deforestation rate of 1.2 percent. This same study estimated 69,550 km2 of forest cover in the eastern region of the country. Estimates derived from 1985 satellite imagery came up with 38,000 km2 for the same region (WCMC 1991).

When humans first arrived in Madagascar some 1500-2000 years ago, much of the island was heavily forested. Despite certain indigenous measures to promote forest protection (IUCN 1991), the livelihood of the island's expanding population depended on the conversion of forest to cropland. The 1992 UNCED meeting on the environment and development pointed out that Madagascar was unique in terms of the pervasive ecological destructiveness of traditional agricultural production systems posing the *principal* threat to the island's biodiversity. The combination of lowland irrigated rice systems with upland swidden or *tavy* plots and extensive livestock raising results in the world's highest rate of erosion: 400 tons/hectare/year in the worst areas. This consumptive system is reducing forest cover by an estimated 200,000 hectares/year. Annual burning of some 5 million hectares keeps regeneration in check. Unless current trends are radically modified, little old growth forest will remain in 20-40 years.

The rift that isolated Madagascar from the African continent about 165 million years ago engendered the speciation that is responsible for the country's unprecedented levels of endemism: 98% among palms, 93% of the primates, 95% of the island's reptiles, and some 80% of the flowering plants. Most of Madagascar's biological diversity is found in the forests that ring the island. Rainforests flank the coastal plain and lower eastern slopes of the central highland plateau; montane forests are found in the highlands while unique spiny forests dominated by euphorbiacae and didaeracae are found in the southwest; semi-arid forests typified by the baobab occupy the western piedmont along with some of the world's most extensive mangrove stands along the coast. The range of habitats and lack of predators created Madagascar's status as one of the world's countries of biological megadiversity. The rich fauna is symbolized by the charismatic and diverse lemur family. The German primatologist Bernhard Meier called these natural reservoirs of life Madagascar's "necklace of pearls". Dr. Alison Jolly (in Lanting 1990), who has worked in Madagascar for over three decades remarks:

Each forest is a pearl without price. And each forest is as precious as another: They cannot be substituted for each other. Every province can boast that it has plants and animals that are unique, just as Madagascar as a whole is unique."

Conservation in Madagascar

In 1984, Madagascar adopted the Malagasy Strategy for Conservation and Development, thereby becoming one of the first African countries to frame a comprehensive approach to conservation. A year later, the government with international donor and PVO support organized an international conference on environmental problems. Donors and the government gave explicit consideration to establishing the necessary mechanisms to halt resource degradation. In 1986 a Protected Areas Management Project was instituted under the Department of Waters and Forests (DEF) and the first nationwide survey of the existing network of protected areas was carried out (Nicoll and Langrand 1989). Results from this pioneering work fed into the National Environmental Action Plan for Madagascar (NEAP).

By shifting the focus away from rural policing, the National Environmental Action Plan represented a major departure for Madagascar in its approach to environmental conservation. It attempted to reconcile economic development with environmental conservation and to explore ways that these two previously opposed goals could play complimentary roles.

The NEAP effort continued over much of the late 1980s with multi-lateral and bi-lateral donors (particularly the World Bank and USAID) as well as non-governmental organizations (specifically WWF) supporting the government of Madagascar. The NEAP became official in December 1990 as part of the Malagasy Environmental Charter (Law 90-033). The NEAP provides the rationale and conceptual framework for environmental policy and programs throughout Madagascar.

As an action plan, it sketched a series of activities which were to be rendered operational by the 1989 Environment Program 1 (EP-1). EP-1 was intended to be the first five-year segment in the implementation of the fifteen year NEAP. It outlined six components to address the NEAP's programs: 1) protecting and managing biodiversity and essential ecological systems and surrounding peripheral areas where resources are most threatened; 2) promoting soil conservation, agroforestry, reforestation and other rural development activities in priority zones; 3) improving land security and developing cartographic and cadastral tools; 4) promoting environmental awareness, education and training; 5) launching environmental research programs; and 6) developing a support program composed of institution building, establishing environmental impact assessment procedures, strengthening the environmental data base, monitoring and evaluation, and studies (GRM 1989).

Under the NEAP, Madagascar has embarked upon an ambitious and innovative biodiversity conservation effort centered on protecting forest habitat in so-called Priority 1 sites. The country's approach entails devolving the state's park and protected area management responsibilities to a non-governmental coordinating body which in turn allocates individual protected area and peripheral zone development responsibilities to a series of private and public operators. Even to begin serious implementation of EP-1 which only started in 1990, new governmental and non-governmental institutions had to be created.

On the government side, the National Office for the Environment (*Office National de l'Environnement,* ONE), is expected to integrate environmental concerns into the national development policies and programs by working with the sectoral ministries who retain implementation responsibilities (except for certain protected areas which have been devolved to NGOs). At the time of the CDIE assessment, ONE's institutional home had yet to be established, and relationships to existing institutions such as the Department of Water and Forests (DEF) remained unclear.

Perhaps, the most unique and ambitious component of EP-1 involves the establishment of a National Association for the Management of Protected Areas (ANGAP). As an NGO spawned by the devolution of authority and personnel from the DEF and its Nature Protection Service, ANGAP has begun to exhibit autonomy in the assumption of coordination and monitoring responsibilities for the country's protected area system.

Both the NEAP and the Protected Areas Programs favor investment in NGOs working in the buffer zones of protected areas. Two newly established NGO consortia, the National Association for Environmental Actions (ANAE) and the Malagasy Committee for Development and the Environment (COMODE) could play support roles for this activity. As discussed below in the findings sections, progress is constrained by the limited implementation capacity of Madagascar's NGOs.

The key remaining component of the biodiversity program is the strengthening of management of individual protected areas (and their surroundings). Madagascar's expanding system of protected areas includes almost fifty parks and reserves. Of these fourteen are classified as "Priority 1" with the remainder being divided between Priority 2 and 3 (see Appendix B). One of the program's initial objectives is to negotiate agreements with "operators" (usually international NGOs). These agreements are not only for the management of the protected area but also for the implementation of related development programs in the surrounding areas. Most of the Priority 1 sites have or are negotiating such agreements. Alternative arrangements (such as combining Peace Corps Volunteers and DEF forestry agents) are being developed for areas lacking comprehensive agreements with an operator. Conservation grants

implemented during the mid to late 1980s laid the basis for this largely privatized operator model of protected area management.

The USAID Assistance Approach

It is the first component of the EP-1 -- protecting and managing biodiversity -- that USAID took on, and it is through a focus on improving protected areas management that USAID felt this goal could best be achieved. One of several donors, USAID/Madagascar has played a central support role to the institutions responsible for updating and expanding the national protected area system. Total funding for biodiversity conservation and related natural resource policy and institutional support exceeds $100 million. It is important to point out that disbursement of these funds is in its early stages and has thus far accomplished the "stage setting phase" of what promises to be a major program effort. In some aspects the program has already begun to have an impact in terms of changed practices and conditions at the field level. While it is therefore premature for a full program impact evaluation, the time is apt to assess initial results of the early field-based grants directed to linking conservation and development activities in and around a number of the country's protected areas. It is these grants that prompted USAID to propose its current field program in the form of the conservation/development hypothesis stated in the introduction.

The assessment is then somewhat exploratory when compared to the more common impact assessments that CDIE usually carries out. The fact that biological diversity conservation is central in the new USAID Strategy for Sustainable Development (1994) further substantiates this effort to document early results.

USAID's support to the conservation of biological diversity in Madagascar grew out of concern for improving forest management upslope from irrigated rice perimeters throughout the country. An initial series of "micro projects", backed by PL480 funds, was followed in the late eighties, with added impetus from the Development Fund for Africa's Plan for Improving Natural Resource Management, by a number of biodiversity grants (including Operationl Program Grants to Ranamofana, Baeza-Mahafaly/Andohahela, Masoala, and Amber Mountain) for "conservation through development" projects. This led finally to the larger and more comprehensive national level policy and planning and institutional support projects, the $40 million SAVEM project (See Box 1) and the $42 million Knowledge and Effective Policies for Environmental Management Program (KEPEM) (see Box 2). KEPEM is intended to be the primary means of providing technical assistance to the National Office of the Environment in its effort to set appropriate policies, monitor, and help implement the NEAP.

Since it began in the late 1980s, the USAID program has followed the general trend in the international environmental field

away from strict preservation of biological diversity toward a more holistic approach integrating the conservation of biodiversity with natural resources management for economic development. Only after the adoption of EP-1 in 1990 has USAID/Madagascar operationalized current support to the testing of the integrated conservation and development paradigm. Despite USAID's emphasis on the use of NGOs, ongoing attempts to institute reforms at the DEF should, when successful, facilitate USAID-supported activities.

CDIE's assessment in Madagascar documents the impact or

Box 1: Sustainable Approaches to Viable Environmental Management -- SAVEM

USAID's commitment to biodiversity conservation was embodied in the $26.6 million "Sustainable Approaches to Viable Environmental Management" (SAVEM). Its specific purpose is to identify and initiate systems (including institutions, methods and behaviors) to manage, on a sustainable basis, protected areas and their buffer zones. Since 1990 when the project agreement was signed, USAID has provided operational support and technical assistance to the National Association for the Management of Protected Areas (ANGAP) and to the Grants Management Unit (GMU), a specialized unit for administering SAVEM funds. SAVEM is also developing a biodiversity monitoring and information service. Sub-grants under SAVEM are financing management and buffer zone development for up to six protected areas. Recognizing that biodiversity could have direct socio-economic benefits, SAVEM seeks to further sustainable ways of life in areas of threatened biodiversity on the assumption that when local peoples understand the linkage, improved conservation practices will follow.

In an amendment extending the project from 5 to 7 years, USAID added an additional $13.4 million to provide technical assistance to ANGAP in part for the development of a comprehensive scientific data base on biodiversity in Madagascar and in part to increase funding for individual integrated conservation and development grants.

changed conditions brought about by protected area projects that received USAID funding beginning in the mid to late 1980's and fed directly into the new operator-based model of protected area management. Although more recent program activities are not ignored, the focus on changed conditions meant that most of the evaluation team's effort was directed toward the two main mechanisms of the earlier interventions that under the new program are already beginning to make a difference at the local level. These are:

- **institutional support financed through a Debt-for-Nature Swap, and**

- **conservation through development grants to specific protected areas.**

Debt-for-Nature Swap Program. Through a $1 million grant to WWF, USAID facilitated the first debt-for-nature swap in Africa. The loan repurchase reduced Madagascar's foreign debt burden by $2.1 million. An additional debt swap for approximately $1.9 million has since been put into place. Of the original $1 million grant to WWF, $.7 million used to retire the debt was supplemented by funds from other sources including WWF' core budget. Interest from the retired debt account is being used to:

- strengthen the DEF outreach capacity;

- improve protected area and forest management;

- carry out reforestation activities;

- develop training materials and administrative procedures to insure the sustainability of improvements.

Conservation through development grants. Many of these USAID-supported conservation through development grants involve high priority areas for biodiversity conservation including the Andohahela Integral Nature Reserve, the site chosen as by CDIE for field study. These grants, which were usually supplemented by grantee funds from other sources, generally provided for multi-year projects with components in 1)inventory and conservation of biological resources for a given site; 2) rural development activities targeted to surrounding populations; and 4) conservation education. While most of the field level conclusions presented in the report are specific to Andohahela, CDIE reviewed documentation of the ICDP experience in other sites and concluded that many of the observations, issues, and lessons cut more broadly across the protected area program. Other grants include the following:

Funding for the establishment of the Ranomafana National Park in May 1991. ($3.2 million to Duke and North Carolina State Universities)

Maintenance and improvement of Beza Mahafaly Reserve. (Two grants totalling about $.3 million)

Conservation of the Masaola Penninsula. (grants to Missouri Botanical Garden to establish park and rural development project)

Amber Mountain National Park ($.9 million grant to WWF for integrated project which included development of tourist facilities)

The Andohahela Protected Areas Conservation and Development Project. The Andohahela Integrated Reserve comprises 76,000 hectares in the southeast corner of the island. It is the only protected area to encompass the interface between the eastern rainforest and the drier spiny forest of the west (Appendix C). Building on biological and socio-cultural surveys carried out by WWF in 1984-85 and 1987-88, the Andohahela Protected Areas Conservation and Development Project was designed to maintain and protect the biodiversity within Andohahela Reserve and adjacent classified forests and to promote the sustainable use of resources around these sites (WWF 1993c).

Although the project in its current form is quite recent, WWF's involvement in Andohahela dates back to the mid-1980s. In 1985 WWF's Conservation in Southern Madagascar project, which had initially focused on conservation activities at Beza Mahafaly, was expanded to include Andohahela (Wells and Brandon 1992). The Beza project, which has had some level of activity since 1977, was a smaller and less complex undertaking than Andohahela. Andohahela is much larger (76,020 ha versus 600 ha for Beza Mahafaly) with concurrently larger and more diverse populations than for Beza. Between 1987, when project activities begun at Andohahela, and 1989 exploratory biological and socio-cultural studies were conducted. The WWF team sponsored construction or repair of water control devices and market gardening. These development activities were carried out on a very limited scale but served to open the door for the larger effort that followed.

In 1989, WWF and DEF submitted a proposal for funding a two year project in Andohahela. At the end of that year the proposal was approved and funding secured from a variety of U.S. government and non-governmental sources (USAID grant, PL480 funds, WWF core funds, MacArthur and Ortenburg Foundation grants). Initial project activities focused on the recruitment and training of project staff, identification and delimitation of reserve boundaries, and the improvement of requisite infrastructure for development and education activities. In each of thirteen pilot villages, several education and development activities were begun.

To achieve this goal, the project objectives are:

1. to replace destructive exploitation of the reserve's resources with sustainable alternatives,
2. to address the social and economic needs of people living around the protected areas in an effort to balance the immediate costs of conservation with benefits,
3. to create an appreciation among local residents of the relationship between conservation and development,

4. to review the legal limits and statutes governing the reserve in view of defining a more appropriate delimitation and reclassification, and, thus, leading to the possible development of tourism and to the increase in economic benefits returning to local residents,
5. to develop an effective system of education and biological and social research within the project zone by both students and conservation professionals,
6. to reinforce the capacity of local institutions (both governmental and non-governmental) and village associations to manage natural areas and to promote sustainable conservation and development activities.

To better realize these ambitious objectives, the Andohahela project is currently in a period of reorientation and redesign. A 1992 evaluation pointed to the lack of a long-term strategy and baseline data against which to monitor project progress in achieving its goals. In response to these findings, to a changing context for implementing conservation and development projects, and to new leadership within the project, participatory rural appraisal teams are now carrying out an extensive array of field studies and surveys which will form the basis of this redesign. These studies cover baseline socio-economic studies (including natural resources use, agricultural practices, basic demographics and health); spatial analysis of human pressures on the reserve; animal husbandry, agriculture and forest management potential in the area, and; baseline biological inventories within the reserve.

Other assistance. Centrally-funded projects have been used extensively first in establishing the program and later in its expansion. Coordination between the USAID/Madagascar and its project portfolio and Washington has generally supported a common agenda. For example, the USAID mission hosted field missions from centrally funded projects or has used buy-ins to the Decentralized Financial Management Project, the Land Tenure Center, and others. Some of these have been channelled through the Africa Regional Bureau's Policy Analysis, Research and Technical Support project.

Another centrally-funded activity of importance to the CDIE evaluation involved the Natural Resource Management Support - NGO/PVO project (NGO/PVO-NRMS). This project allocated about $230,000 to help establish a consortium of NGOs, the Conseil Malagache des ONGs pour le Développement et l'Environnement (COMODE). This NGO capacity building sub-project provided training and institutional support to 1) facilitate access to a wide NGO community, 2) generate and disburse funds to support natural resource management activities, and 3) administer and monitor the country program engendered by the first two. COMODE was to develop a roster of providers of technical service and insure financial, operational, and technical sustainability after USAID support ended.

Factors affecting performance of USAID's assistance. In 1991 and 1992 the entire country experienced a general strike for seven months which effectively shut down many aspects of project operations. Fuel and other essentials were in short supply or non-existent. Civil servants were on strike. The situation in the capital was volatile with some large demonstrations and an increasing problem of security that extended even into the provinces. This general strike and demonstrations led to the fall of the old regime and the installation of the current, democratically elected leadership. Not only did these events bring activities to a standstill in these years, but the new government is still trying to sort out the problems left by the old regime.

Since 1990, the Andohahela project has weathered numerous storms. Compounding the domestic political transformation, in 1992 serious drought and famine gripped the south of the country. This had a very significant impact on projects such as the Andohahela project that were trying to operate there. Andohahela project resources were often brought to bear to alleviate the famine conditions in the project area (WWF 1992). Villagers migrated to famine relief centers and reforestation and other project activities suffered. Project staff assisted in famine relief activities whenever possible and delayed critical project planning until the situation improved in late 1992 and early 1993. Although it is not known how much this drought contributed to internal migration from the south to the north, key informants sensed that it has further exacerbated problems of migrant settlement around areas like the Amber Mountain Complex in the North.

Reliance on USAID PL480 funds also brought problems that forced the project to scale back once these funds were not forthcoming. These external factors have significantly affected the project's performance and have thus been important in shaping the CDIE team's conclusions about Andohahela.

The USAID mission itself had two direct-hire staff in 1988 when their FY 1990 Concept Paper was written. In this paper the authors recommended the addition of two direct-hire positions. Subsequently, the Mission has experienced rapid growth in personnel and programs. The current staff level of about 150 includes 12-14 USAID direct hire employees. At the same time the Mission experienced difficulties in critical Mission leadership positions which strongly influenced staff ability to carry out field programs.

3. EVALUATION FINDINGS: PROGRAM IMPLEMENTATION

The assessment design articulates four strategies as determinants of the performance of biological diversity conservation programs receiving USAID support:

- **Institutional strengthening** -- the creation and strengthening of local and national level public agencies and non-governmental organizations to carry out programs aimed at forest and other habitat and wildlife protection;
- **Awareness and education** -- the increase in local and national knowledge and understanding of the value of habitats;
- **Policy change** -- the change in national policy for habitat protection and wildlife conservation that identifies and controls sustainable resource use within and around protected areas and enhancement of market incentives for habitat protection;
- **Technological development and change** -- the introduction of new practices and techniques compatible with habitat protection, whether inside or outside the protected area.

The evaluation assesses the ways in which the USAID-supported program in Madagascar has used (or did not use) these strategies to foster habitat and wildlife protection. This section examines the strategies and the conditions created or changed through their implementation. Both national-level findings and data gathered during the Andohahela field visit are presented.

Institution Building

Institutional issues and problems have been and continue to be a major focus of the USAID program in Madagascar. Within the framework of the NEAP, USAID has been the primary donor assisting the establishment and development of the National Association for the Management of Protected Areas (ANGAP). The Debt-for-Nature Swap's strengthening of the DEF and the centrally funded effort through the NGO-PVO NRMS project to establish and strengthen COMODE were primarily exercises in institutional strengthening. Local NGOs were to be strengthened by working in partnership with international counterparts. The new KEPEM program is beginning to support the National Environmental Office.

National Level Institutions

USAID has played a central role in launching ANGAP, a quasi NGO that has assumed day to day coordination of the country's protected areas program.

USAID has been instrumental in the creation and support of a radically transformed approach to the management of Madagascar's protected areas system. Central to this approach is the development of the National Association for the Management of Protected Areas - ANGAP. ANGAP is well structured with three functional departments- Monitoring and Evaluation, Human Resources/Training, and Finance and Administration-and has begun to implement explicitly defined procedures. A fourth, the Department of Information and Valorization of Biodiversity, has been initiated through an approved amendment to the SAVEM project.

ANGAP's creation represents a significant step taken by the Government of Madagascar toward devolving authority for the management of the nation's protected area system. Although largely staffed by former government (mostly DEF) employees, ANGAP has, since its creation in 1990, evolved as an increasingly focussed and autonomous institution devoted to coordinating protected areas management. Its procedures are designed to coordinate and harmonize development and conservation throughout Madagascar's protected areas system. It has held workshops, conducted field visits, and drawn up training plans to reinforce activities in and around protected areas. ANGAP has reviewed efforts to integrate conservation and development in Madagascar and elsewhere and has synthesized the results into a set of guidelines which it uses in its coordination function vis-a-vis the individual operators. At the time of CDIE's visit, ANGAP was moving towards incorporating a separate unit established under SAVEM to allocate and monitor the project's biodiversity grants. As an indicator of confidence in ANGAP's existing capacity, the World Bank entrusted ANGAP with the management $1.3 million in loan funds.

Given the short time since this function has been shifted away from formal state structures, the importance of this accomplishment can be easily obscured by inevitable "growing pains" inherent to new institutions. Much remains to be done in terms of institutional development, devolution of authority from the DEF, and refining ANGAP's procedures to enhance performance and substantive exchange between members. This latter point is further elaborated in subsequent sections of this report.

ANGAP allocates management authority for individual parks and protected areas to operators who mostly consist of international universities and conservation NGOs. The DEF has ceded this authority with reluctance and until recently maintained direct involvement in management through a number of mechanisms (appointing national directors, influencing protected area steering committees,

behind the scenes maneuvering, and most recently by presenting itself to ANGAP as an "operator").

As an *association*, ANGAP should provide a forum in which all members' perspectives are represented. This has not yet happened. Operators have exhibited a minimal sense of ownership in the association. Measures such as decentralizing some functions or rotating former field directors and staff into ANGAP staff positions (or rotating out ANGAP staff to field implementation positions) have been discussed but not enacted. The result is that operator staff view ANGAP as a group of well paid, former government employees who lack adequate sensitivity to field-level operational constraints.

Operators are concerned that ANGAP's effort to coordinate resemble the old style control associated with the DEF; however, the policy change allowing operators more autonomous choice in national directors is a positive countersign. This is a critical issue because if operators are expected to be responsible not only for protected area management but for a variety of other activities all around a given protected area, they must have sufficient autonomy in choosing their staff and advisors.

Another critical issue revolves around the further devolution of authority from the DEF[1]. At least until recently, the DEF retained control of ANGAP through presidency of steering committees for each protected areas project, control of the Board of Directors, by having the final decision on the appointment of national coordinators for protected areas, and through control over the final execution of agreements for protected area management plans and projects with operators. This has contributed to the perception of ANGAP as an "extension of DEF" or "another layer of bureaucracy." A long term vision of what ANGAP is eventually to become has yet to be articulated. Through its SAVEM project, USAID is taking steps to encourage the various stakeholders to define and embrace a shared vision of ANGAP's future (USAID 1993).

The creation of ANGAP at the central level has thus far made little difference at the field level.

ANGAP staff have visited and introduced new reporting and design procedures to protected area operators, but this has not yet changed management or community development practices. The principal change at the operator level introduced by ANGAP and the Grants Management Unit (GMU) is an increased rigor in the development of what are called Phase II, ICDP grant proposals. Designs must now reflect a set of coherent strategy guidelines and include a plan for

---

[1]. This importance of this issue is emphasized in the World Bank Mission Report reviewing the progress of the implementation of the Madagascar National Environmental Action Plan, July 1993.

performance monitoring and reporting against these new standards. ANGAP staff have visited projects and the groundwork for two-way communication is being put into place. Tensions between ANGAP and the protected area operators prompted USAID to organize a professionally facilitated strategic retreat to better define relative roles and procedures. There is evidence of more two-way dialogue between ANGAP and operators having followed these workshops; both are recognizing that their respective success depends on a firm and functional partnership.

USAID's program in Madagascar has promoted a protected area program strategy which reserves a predominant role for international and indigenous NGOs.

Although results have been mixed, USAID has supported NGOs through: 1) direct grants to international NGOs, 2) a Grants Management Unit (GMU) under the SAVEM project to fund both large comprehensive grants and smaller more focussed grants, 3) teaming relationships between principal operators and other NGO partners in ICDPs, and 4) institutional support to encourage networking among local environmental NGOs.

Citing technical expertise, Madagascar experience and knowledge of biological diversity issues, USAID chose international conservation complemented more recently by development NGOs as project implementors and operators of protected areas[2]. Under the SAVEM Grants Management Unit and ANGAP, this partnership was extended to non-conservation NGOs such as PACT and CARE. The intent is to complement the formers' scientific expertise with the latter's development expertise. Both types of NGOs are stretching to become proficient in, or at least oversee, activities outside their traditional areas of expertise and intervention.

USAID's SAVEM project - both the GMU and the ANGAP component - works closely with NGOs to develop comprehensive and viable project proposals for ICDPs, operating guidelines, long-term project management strategies, monitoring and evaluation guidelines, training opportunities and other aspects of project development. Ultimately, ANGAP will have sole responsibility for these functions, and it is moving rapidly to assume them. It may eventually take on direct management of protected area grants and it may move into direct park management. Coordination, oversight and the exchange of lessons will become more important as both ANGAP and its members gain experience with integrated conservation and development.

The institutional development of indigenous NGOs is being

---

[2]. Conservation NGOs currently supported by USAID in Madagascar include: Conservation International, WWF, Missouri Botanical Garden, and Wildlife Conservation Society. Development NGOs include CARE International and VITA.

attempted through two venues: the SAVEM project and the Washington-based NGO-PVO/NRMS Project. Through the GMU, USAID has attempted to strengthen local NGOs both through the large ICDP grants and through much smaller Community Action Grants (CAGs). The large, international NGOs who are the intended recipients of the ICDP grants are expected to develop some form of partnership with local NGOs and thereby build their capacity to work on integrated conservation and development projects. This was also attempted with little success in the earlier conservation through development project grants (Amber Mountain, Ranamofana, Andohahela, and Masoala).

The CAGs were originally intended to target local NGOs by giving small grants directly to them for development activities around protected areas. The GMU quickly found that the institutional infrastructure of Malagasy NGOs was insufficient to absorb even the smallest of grants. Consequently, less than a handful of CAG's have been granted. The GMU is refocusing to provide capacity building assistance to assist local NGOs.

Through its centrally-funded, four-country project, NGO-PVO/NRMS, USAID has supported the development of COMODE (Comité Malagache pour le Développement et l'Environnement), a national consortium of Malagasy NGOs.

This activity began in 1989 at a time when the nascent community of Malagasy NGOs was just beginning to discuss the idea of forming some sort of organization. COMODE currently has five staff members and 27 member NGOs throughout the country.

The NGO-PVO/NRMS project took a different approach to accomplish essentially the same objective - to develop and strengthen indigenous environmental NGOs. Through an initial grant of $200,000 in early 1990, NGO-PVO/NRMS catalyzed the establishment of COMODE (Council of Malagasy NGOs for Development and the Environment), a consortium of 27 Malagasy NGOs. According to the president and secretary general of COMODE, use of this grant was to be determined by the consortium. They decided to focus on the three-part program mentioned above: training of NGO staff, information exchange between NGOs and serving as a spokesgroup for indigenous NGOs.

COMODE's mission is threefold: to facilitate the exchange of information among its members, to serve as a voice for the NGO community, and to help strengthen member NGOs through training and other means. COMODE's sole funding has come from NGO-PVO/NRMS. This funding will end in January of 1994. COMODE is currently in the process of soliciting more donor funding to supplement the nominal membership fees.

Despite the difficulties inherent in forming a consortium of highly independent NGOs, and despite divisions within the NGO

community itself, COMODE has made progress in realizing its mission. It has funded a total of six training workshops for NGOs - two in each of three regions (the north, the center, and the south). These workshops have covered a variety of themes ranging from project planning to technical issues in response to NGO concerns. Regional NGOs organized and conducted these workshops. COMODE provided the funding.

COMODE has served as a voice for Malagasy NGOs at national meetings and seminars concerning environment and development (e.g., a meeting on environmental education with ONE, ANAE, ANGAP and WWF, the National Forum in 1992 and other ongoing governmental activities).

Finally, COMODE is involved in a process to more precisely define the legal status of NGOs. This would include a more rigorous registration system for Malagasy NGOs. According to COMODE, and international and national NGO staff, the current NGO registration system has resulted in an enormous number of paper NGOs with no real mission or expertise. Conversations with the president of KIOMBE, a local NGO whose members are working with the Andohahela project to conduct village surveys, indicated that the process was far from rigorous and consisted primarily in applying for status and having this application pass through the appropriate government channels. COMODE is hoping to change this situation in order to legitimize Malagasy NGOs and to set basic standards. They foresee three phases for this work: a seminar in October 1993 to introduce and discuss the idea, work with NGOs and the government on formulating guidelines and, propose a text for adoption by the National Assembly.

USAID and the WWF used a debt-for-nature swap to generate local funds for strengthening the Directorate of Waters and Forests through the creation of a new cadre of field level, paraforestry personnel called Nature Protection Agents (APNs, *Agents pour la Protection de la Nature*).

USAID is also involved in reinforcing the Directorate of Waters and Forests (DEF). The major support at present has been through the Debt-for-Nature program and the creation of a cadre of APNs. This cadre was created in response to a critical lack of DEF field personnel for both regulatory and awareness-raising activities among village populations. A total of 380 APNs have been recruited and trained by the program. They are stationed primarily around protected areas and to a lesser extent around classified forests. Separately, operators have hired project- specific APNs. As more Priority 1 and 2 protected areas receive external funding, Debt/Nature APNs will become more available to work in areas such as classified forests or Priority 3 protected areas.

An important distinction can be made between APNs under the Debt-for-Nature program and APNs funded directly by the ICDP

operators. Both respond to the lack of forestry/environment field personnel remaining after the 1975-1990 period of atrophy in the DEF. APNs are recruited either from the region (Debt/Nature) or from the actual villages for which they are responsible (in the case of operator-funded ICDP APNs). In the former case, they are required to have a BEPC-level education. In the latter case this level of education is often sacrificed to the overriding priority of recruiting from the villages. In brief Debt/Nature agents more closely resemble government staff and operator APNs resemble NGO staff.

The Extension Function

APNs have not yet received adequate technical and communications skills training for them to understand and carry out their extension role.

The Debt/Nature APNs' preparation to carry out informal environmental education has been minimal. They have received approximately three weeks of training since they were recruited in 1990. The first one-week training session conducted in 1990 focused on theoretical discussions of forestry legislation, general, environmental themes and duties of APNs. The second session in 1991 (also one week) focused on technical and theoretical aspects of nursery management, reforestation, forestry and communication (Brandstetter and Gilruth 1992). In 1992, APNs received approximately two weeks of training from their DEF field supervisors on rural extension and development techniques.

Debt/Nature APNs interviewed in the field (in Sisaony near Antananarivo and Tsitongambarika I Classified Forest near Andohahela) expressed a desire for more training in the areas of forestry legislation and extension and development techniques. In Sisaony, the APN went on to say that DEF trainers should come into the field more often to follow-up on their training. The lack of technical support was corroborated by key informants in Antananarivo, who stressed the efficient decentralized administration of the program. The APNs outside of Tolagnaro also expressed a desire for more training but were confident that their immediate supervisor, the *Chef de Cantonnement* of Tolagnaro, would provide it for them. It should be noted that this particular supervisor was extremely motivated and committed to his job and the APNs for which he was responsible. APNs interviewed emphasized their need for further training, particularly as they become more established in the villages and villagers look to them for assistance with general development activities. Lack of training has resulted, in some areas, in an overabundance of monthly village meetings to discuss the same things over and over.

As the Debt-for-Nature project decentralizes APN training to Forestry Agents at the local level, the amount of training is likely

to increase but the quality of training is likely to become even more variable. Moreover, the schedule is being stepped up to two sessions a year. Thus, the current strategy of relying on minimally trained forestry agents to carry out APN training is uncertain. To compensate, the Debt-Nature program seeks older agents with a particular profile and provide theme with pedagogical skills through a training of trainers program.

Staff from several international conservation groups who had worked with APNs commented that the single greatest determinant of APN effectiveness was the quality of his DEF supervisor. The team also witnessed this in our site visits with the *Chef de Cantonnement* de Tolagnaro and several APNs for which he was responsible. His professionalism was reflected in the enthusiasm of his APNs and their interest in their responsibilities.

Due to the current lack of other extension personnel (a situation which may change in Phase II of the Debt-for-Nature project), the APN often tries or is expected to become a general development agent, something for which he is not trained and has only limited on-the-ground experience.

The original concept for the APN role was one of a village-level forestry extension agent who would assist the Forestry Agents but would focus on awareness-raising and be free of the government Forestry Agents policing role and its attendant public relations problems with villagers. However, due to a significant lack of Forestry Agents (and several higher levels in the DEF field structure as well) APNs have taken on a fair amount of policing activities even though they do not have the authority to issue citations and fines.

In the case of DEF APNs, conflicting views about role definition and lines of authority and supervisory responsibility responsible have created some confusion. The DEF has seen the APNs as a reinforcement of their field staffs with minimal limitation to their functions. APNs, and their supervisors, have not always clearly understood to whom they were responsible - the Debt-for-Nature Program or the traditional DEF hierarchy. In the field, DEF supervisors - forest station directors, *chefs de cantonnement*, forestry agents and others - were beginning to make progress in clarifying these points of confusion. However, a continued lack of field-level DEF personnel places heavy demands on APNs that limits the development of their extension functions. It helps that the Debt-for-Nature program is formally integrated into the organizational structure of the DEF.

Debt/Nature APNs and APNs associated with ICDP projects are becoming more and more distinct from one another. Projects have already started to treat APNs as project extension staff and respond to the particular training needs of the project and the APNs

themselves[3]. As integrated conservation and development projects (ICDPs) become more operational in Priority I and II protected areas these projects will take responsibility for some existing APNs (perhaps even changing their titles to reflect their status change from DEF Debt/Nature employee to ICDP employee).

Andohahela ICDP illustrates the critical role played by the APN. Based in the village, from the village, he is the project's eyes, ears, and spokesperson among the villagers. This has had a positive effect on the reserve - decreased incursions and destruction - but it often puts these young village men in an awkward position vis-à-vis their elders.

Local NGO role and capacity.

Support for the strengthening of local level NGO capacity by working through international operators has been limited.

The NGO-PVO/NRMS project has indigenous NGO development as its principal mandate. SAVEM, through the GMU' Community Action Grants, emphasizes working with local NGOs to enhance capacity. By directly targeting indigenous NGOs, CAGs have run into the problem that there simply are not enough local NGOs capable of developing, implementing and monitoring activities with the degree of sophistication that USAID requires. Consequently, this part of the SAVEM project has had to rethink its role and approach and has proceeded much more slowly than anticipated.

The pairing of local NGOs with international NGOs may not be the most efficient and effective way to strengthen local institutions. The international NGOs in question -WWF, Conservation International, CARE International, WCS, Stonybrook- do not specialize and have limited experience in local capacity building. Their experiences in dealing with COMODE and even the largest Malagasy NGOs - SAFAFI and SAF-FJKM - have been generally ineffective.

The experience of the Andohahela project is illustrative. Efforts to work with a Malagasy NGO (SAFAFI) in the area of agricultural extension were unsuccessful in the project's first phase, principally due to poor training of staff, lack of management support and absence of a linkage to conservation objectives. Following the recommendations of the 1992 project evaluation, the project staff are reexamining their relationship with SAFAFI and are actively seeking new local partners.

The project is working with a Malagasy NGO, ASOS (Action Santé

---

[3]. For example, the team interviewed one APN with the Andohahela project that had received some literacy training from the project.

et Organisation de Secours), whose staff carries out primary health care activities. The project funds a mobile health unit which is run by ASOS and travels to villages around the reserve. The CDIE team was not able to meet directly with ASOS personnel, nor with villagers who had contact with them.

To complement its strengths, WWF/Andohahela is working actively with the French NGO, Véterinaires Sans Frontières (VSF) to carry out agro-economic and agro-pastoral studies and participatory rural appraisal surveys in the villages in the peripheral zones. This exercise is accomplishing two institutional goals as well as the more obvious technical goal of information gathering. It exemplifies NGO capacity building and, through affirmative action, seeks to involve women in project implementation.

The survey teams include the personnel of a newly formed NGO called Kiomba whose members have experience in surveys and data collection in the region. Although the NGO members are being hired as individuals and not as an NGO, (Kiomba has not yet completed all of the official paperwork required) this experience will nonetheless be valuable in developing Kiomba as an institution. Working with Kiomba members are eight young women being trained by the project staff. Although it is not yet clear as to how and if these women could work with the project in the future, it is an attempt to rectify the lack of female project field staff. While the institutional arrangement is not yet defined, it is envisioned that VSF will continue to work with the project in its implementation phase.

With few exceptions, local ICDP efforts have not emphasized community organization or the formation of local association.

The team found that except for one isolated case, the Andohahela project had not been active in forming village-level organizations. In one village visited by the team, Tsimelahy, WWF had worked with villagers to form three water user/dam manager groups. This effort was unsuccessful in establishing a link between development and conservation. Instead, it provoked divisions within the village when one dam was completed and the other two were not.

The project APNs are working with local village-level committees: Committee for the Forest and the Environment or KASTI (Komitin'ny Ala Sy ny Tontolo Iainana). These KASTIs were created at the initiative of the Water and Forestry Department (DEF), building on previously created committees to fight brush fires. They consist of two members elected from each of four or five villages within a Fokontany. KASTI members receive no compensation. Their principal role is to work with APNs in awareness raising, forestry activities and as a first line of control of wood cutting in classified forests. Villagers go through KASTI members as a first step in the process of obtaining a cutting permit and people who have worked with KASTI members and APNs to plant trees seem to

be favored. It is through these village-level committees that the DEF's message of one tree planted for every tree cut is transmitted. At Andohahela, the project was beginning to strengthen the KASTI.

Awareness and Education

It has long been recognized that conservation begins with awareness--an awareness, first, of *what* needs to be protected; and secondly, *why* it needs to be protected. USAID channelled its efforts to raise awareness and education in the interest of improved conservation of parks and protected primarily at two levels: policy makers and residents of the park peripheries. The assessment focussed on the second of these groups and asked what difference the program had made in changing behavior vis-à-vis the conservation of park resources.

At the national level USAID has structured its involvement to complement other donors' efforts in programs in environmental education and awareness raising.

The World Wide Fund for Nature has had a national-level program for some time in this area. With funding from European donors, the World Wide Fund for Nature is carrying out a fairly active and visible program for environmental education at the national level. The Education à l'Environnement project (1951/MAG/023), funded through Coopération Suisse, has been in place since 1983 and is housed under the direction of the Ministry of Basic Education (MINISEB). It consists of media campaigns and programs within the formal education system with the Ministry of Education.

ANGAP is interested in the possibility of entering this arena through the production of publications, posters and other public media products. However, it has only produced a few issues of an environmental news magazine, *HANITRINIALA*, and is uncertain as to its financial viability.

Education and awareness raising is an important part of the ICDP local level grants, but results have been mixed.

USAID focussed most of its awareness and education efforts at the local level. USAID's activities in this area are specific to the NGO projects funded through SAVEM, and through earlier, specific grants.

The Andohahela project's environmental education activities illustrate the local level variability and dependence upon the motivation of individual teachers, APNs, and project staff. In the area of education and awareness raising, both formal and informal, the ICDP at Andohahela has made a concerted effort. Project staff are raising the environmental awareness of villagers and government staff simply through their continued presence in and around the

reserve, their discussions with villagers, and project activities. In a more formal sense, WWF and the project have supported teacher training and activities in primary schools and through the village-based APNs.

The project includes two full-time staff in the area of education. This component of the project, including staff, is funded through WWF's Education project described above. The Andohahela education component is involved in nine pilot schools throughout the project area. Collaboration between the project and the government was reported to be excellent. This involvement has included assistance with construction and repair of schools, provision of educational materials (e.g., posters, information) and teacher training. The project has conducted four training seminars for 35 teachers. In addition, the project has encouraged the establishment of school tree plantations and school gardens for practical application of the environmental education message in the classroom. Since the school year had not yet begun during the team's visit to the area, we were not able to talk with teachers or observe students in their classes.

Interviews with WWF education and survey staff and villagers in Ihazoambo revealed that the impact of the project's environmental education activities has been quite variable and highly dependent upon the motivation of individual teachers. In Ihazoambo, for example, survey interviews revealed that the current school teacher was not interested in environmental education and did not present it in his teaching. An interview with a student in Ihazoambo reinforced the survey teams findings. This student stated that although the students had planted some trees, their instructor had given them no explanation why the trees were being planted and how to take care of them. He said that they had never covered environmental issues in class. By contrast, an older student, who had attended the same school three years earlier with a different instructor, was able to talk about the utility of tree planting, the importance of watershed protection and the problems of deforestation.

In Isaka-Evondro, the village nurseryman described at length the school's market garden which was quite successful. The students' parents participated in its management and the proceeds from the sale of its products had gone to improve the school canteen.

Through APN's, the ICDP's are able to create a network of outreach agents who undertake awareness raising activities as one of their central functions.

Two sector Chiefs, eleven APNs, and nine nurserymen represent the Andohahela project at the village level. There is also one post that is currently vacant. Both APNs and nurserymen are recruited from the villages in which they work. Consequently, educational

level of these project staff was of secondary importance in their recruitment. Their preparation has consisted of approximately three weeks of training on forest regulations, nursery and reforestation techniques and village level extension techniques.

Before the arrival of the Debt/Nature APNs, awareness raising was a somewhat informal and random activity of meetings and discussions between villagers and project staff. The arrival of the APNs has brought with it an attempt to institutionalize environmental awareness raising at the village level. Although the role of APNs also includes surveillance and patrolling, awareness raising and education is seen as one of the principal functions of the APNs.

APNs, both Debt/Nature and operator-funded, are scheduled to spend 15 days a month traveling to the villages for which they are responsible. During these visits to their villages they often conduct village meetings to communicate environmental messages. APNs lead discussions on the importance of reforestation, the need to protect the reserve and more general environmental themes. The main environmental message that APNs and villagers told us was the connection between deforesting hillsides and water management problems in the rice fields. An even more direct message was to make it clear that the reserve is off-limits, a relatively new emphasis after the last government's laissez-faire attitude towards protected areas. Other APN activities include patrolling the reserve and soliciting villager participation in creating firebreaks, reforestation and other communal activities.

Finally, the entire project staff has contributed to the raising of villager awareness of the project and the reserve. Within the last year there has been a dramatic increase in project field presence with studies and surveys being conducted throughout the periphery zone. The process of redelimiting reserve boundaries has also served to remind the local population of the reserve's existence and importance and to inform them as to where the actual boundaries are.

The team interviewed several villagers in Ihazafotsy, Tsimilehy, and Ankazafotsy who were unable to explain the purpose of development activities carried out in their villages. At the same time, some of the local leaders were able to articulate the objectives of the development activities very clearly. The team witnessed an exchange between the project conservation chief/DEF canton chief and the Ihazafotsy village chief regarding whether or not the latter indeed understood what the project was doing in his village. The team has no doubt that project staff does explain what they are doing in a village and why. There was also little doubt that the message in this case was not received and understood as intended. This points to the need to improve communication to assure that villagers increase their understanding of the link between conservation and development.

Policy Change

An enabling policy environment is critical to getting biodiversity conservation situated in the Madagascar's overall development. Important questions surround the valuation, valorization, and equitable distribution of benefits of biological resources such as the medicinal use of genetic resources or of the trade in live and non-living plants and animals. Transport policies such as those controlling airline landing rights are of major importance to the long term development of tourism in the national park and protected area system. Sectoral policies such as those governing forest use and forest access within reserves but more importantly outside them affect the possibilities and willingness of neighboring populations to participate in integrated approaches to conservation and development. Considerable hope is placed on tourism's potential to generate benefits both to ecology and the local economy. The policies governing public access, private concessions, internal park zoning, and revenue distribution are outdated, uneven, and in need of revision and streamlining. Institutional policies such as those governing the actions of NGOs (e.g. in their capacity to engage in revenue generating activities) or of their legal status (including ANGAP itself) come increasingly into question as the implementation of the Protected Areas program progresses. CDIE found that the PAP stakeholders were generally aware of these and other policy issues; however, systematic efforts to address policy constraints seemed to be on hold until the KEPEM project is implemented. This evaluation, while noting the need for policy reforms, can say little about changed policy conditions as a result of program implementation to date.

Although USAID has supported policy change at the national level (an activity that will intensify when the KEPEM projects gets underway in earnest--see Box 2), there have not been any changes in policy initiated by the Andohahela field staff.

The decision to shift protected area management coordination from GRM to ANGAP is the central policy shift associated with USAID's biodiversity conservation program. An open policy toward tourism has also been encouraged including such measures as liberalizing the national airlines monopoly has been discussed but does not yet figure prominently in USAID's program. USAID did support a national ecotourism seminar. Technical assistance to ANGAP included two short term consultants' reports on tourism potential, but these have yet to be translated to meaningful change. The most significant shift in policy conditions with respect to tourism involves the assistance conditionalities which persuaded DEF to transfer of responsibility for collection and management of the visitor fees to ANGAP. ANGAP, in turn, has agreed to share these revenues with peripheral zone dwellers. The intent is that this policy will increase local willingness to accept the existence of the park and respect the rules governing it.

Box 2: KEPEM - Knowledge and Effective Policies for Environmental Management

In May, 1992, the grant agreement between the government of Madagascar and the U.S. for the Knowledge and Effective Policies of Environmental Management (KEPEM) was signed. The five-year program consists of a $33 million non-project assistance component which will be used for debt servicing by the government of Madagascar. Along with the conditioned fund transfers, KEPEM includes a $9 million project component to provide technical assistance and limited short term training and commodities over a five-year period to support policy and institutional reforms. This brings the total for the program to $42 million over five years.

As a non-project assistance program, meaning direct disbursements to the government in exchange for pre-agreed policy reforms in the natural resources conservation sector, the program's resources support: 1) development of fiscal and economic policies for more rational use of forest resources; 2) establishment of an environmental endowment to promote sustainable financing of the new programs; 3) strengthening of institutions involved in the environmental sector and, importantly, 4) support for the development of local initiatives in conservation activities by delegation of administrative and fiscal authorities to regional and local organizations.

The decentralization aspect of the KEPEM program, which is in line with the focus of other major donors like the World bank and UNDP, seeks changes in the regulatory environment to empower and legalize local NGOs and community organizations and to address other constraints to improved natural resource management. In addition, the program also will encourage the government to put policies in place that encourage the work of NGOs and that create a regulatory framework to facilitate their involvement with development activities and ease of access to donor resources.

The basic premise of the KEPEM approach is that forest and biological resources can be successfully maintained only if it is in the self-interest of those with effective control over resources to sustain them; if technically feasible resources management options exist and are available to "resource managers"; and if the generalized system of incentives--policies, prices, administrative procedures, extension support, information and awareness, --provides clear, consistent and stable signals in support of long-term resources management initiatives.

One of the tourism related policy issues concerns park zoning into variable use zones. This is beginning to take place at Mt Amber and other sites. Other protected areas' operators are discussing the similar revision in classification policy. Also under consideration would be a change in access policy through the creation of several use classification units within a single protected area context. The Andohahela project's efforts to reclassify part of the reserve as a national park and thereby benefit from the more liberal management possibilities of that classification, would certainly be a change. Systematic updating of classification policy was recognized, especially by some operators such as WWF, as being overdue. The category of Integral Nature Reserve, for example, with its policy of total exclusion was in direct conflict with realities and realistic expectations. At Andohahela, efforts to initiate tourism, to re-demarcate boundaries, and to establish limited use contracts (*dina*) with surrounding villagers were all subject to revisions in policy.

Technological Change

The assessment sought evidence of technology change to conserve biological resources in three general domains: park management (demarcation, protection, research, habitat manipulation, monitoring, etc), improved resource management in buffer areas (community forestry, conservation farming) and community development activities (alternative livelihoods and small enterprise) that attempted linking conservation and development.

Operators have not yet incorporated research and baseline data into sound management plans, implementing them or monitoring impacts of project activity.

Little of direct practical management value appears to have come from early biological and ecological research in the initial phases of operator involvement in the protected areas. On the one hand, there continued to be a traditional focus on species level studies on the part of expatriate scientists. On the other hand, there was a sense on the part of the government and others that biological baseline studies were a luxury that Madagascar could ill afford given the immediate threat to protected areas and the pressing needs of the population. In fact, because management *per se* was not the driving force for much of the biological research, research results that would be of value tend to be unavailable and/or not systematically organized.

It is only now that operators are putting together teams of scientists to fill this critical gap in baseline information. In the case of Andohahela, the scientific research that was carried out within the reserve was not comprehensive enough to help the project with its much broader mandate of conserving biodiversity in Madagascar. To overcome this limitation, the project initiated comprehensive biological inventories in late 1993.

Operators have demarcated clear project boundaries in some sites, and, where they are ambiguous or inappropriate, project staff are collaborating with the DEF and local communities to revise them.

With respect to conservation technologies or practices, ICDPs reflect the conservation management experience of most operators. As a result more pronounced impact can be observed. Reserve boundaries have been clearly demarcated in some areas with clearings, firebreaks and signposts. APNs regularly patrol the reserve and work with villagers to build firebreaks and fight fires if they break out. Their presence alone (along with members of some village KASTI) has served to alert and remind villagers that the reserve is off-limits and that it is being actively managed. APNs have no enforcement authority, but they are seconded by project and DEF staff who regularly investigate cases of illicit encroachment. The reporting system was so well-established that keeping up with reported violations was overtaxing the DEF staff.

Based on a series of rather disjointed, small-scale activities in the thirteen initial pilot villages in the Andohahela Reserve, the project recognized the lack of an overarching strategy that linked these activities to a conservation objective.

Secondary sources confirmed that this problem was typical for the early phase of conservation and development projects. Activities such as market gardening, water management, tree nurseries and reforestation and small livestock production have all been carried out on a very small scale. It is only recently that basic socio-economic surveys and studies of resource use and agricultural production are being systematically undertaken.

In the area of agriculture, the project contracted with a local NGO to carry out agricultural extension in the area. This did not prove effective as the local NGO did not fulfill the terms of its contract (WWF 1992). There have been market gardening activities in ten pilot villages, but due to a combination of drought and a lack of technical training, results were minimal. The team did discuss an apparently successful school garden activity with a villager in Isaka-Ivondro. We also encountered an unsuccessful individual effort in Isoambe.

A single water management activity in the village of Tsimelehy currently enjoys a certain amount of technical success. However, due to inadequate villager organization and poor technical preparation of other, related sites, this technical success was achieved at a social cost of unequal benefit distribution and unacceptably high social division. After implementation, the focus was on who did or did not benefit and not, for example, on how better upslope watershed management.

The team visited two village-based poultry projects introduced by VSF that are too recent to evaluate. Although ownership of the chickens was unclear to participants, they expressed confidence of their right to the proceeds from egg sales. It was unclear as to how much experience villagers had in selling eggs and what the market for eggs really was. The villagers also had technical questions which had not yet been answered. The CDIE team found no evidence that the poultry program was logically linked to reducing human pressures on the reserve.

The primary technology introduction in the Andohahela project area is seedlings for reforestation. The project has established nine village tree nurseries and has begun to help individuals establish private tree nurseries. Tree planting programs have been carried out in 17 villages and a total of 43,507 trees were outplanted during the first part of 1993 (75% of nursery production). Of the trees outplanted, almost 50% were planted by individuals. This is an increase over the 29,170 trees planted during the drought the year before.

Village tree nurseries and communal woodlots have a role to play. However, devolving responsibility for tree production and tree growing to individuals is ultimately more sustainable and more practical. The project has begun to move in this direction with an emphasis on individual outplantings and the establishment of individual tree nurseries.

Tree species offered by the WWF nurseries (which offers seedlings free of charge) are almost exclusively those exotics generally propagated by the forest service. Of these exotics, *Eucalyptus* spp. predominates. It is the best-known reforestation species by villagers who cited its adaption to poor soils and coppicing properties. Other exotics such as Neem, Acacia, Casuarina are less known and less popular. There has been some attempt to produce indigenous species (which would respond to the villager demand identified in an earlier project survey), however, to date efforts have been limited and subjected to technical difficulties in seed collection, storage and treatment[4].

Finally, the project is now producing fruit trees (mangos and oranges) as an incentive for villagers to plant trees. One or two fruit trees are given out with forest tree seedlings. The demand for fruit tree seedlings and the possibility of selling these seedlings is also the primary incentive for individuals to start private tree nurseries. The project is moving in this direction in the hopes of fostering sustainability in seedling production.

In Andohahela as elsewhere, project staff have yet to address

---

[4]. Interview, Mr. Nataud, WWF staff in charge of tree nurseries. Ihazoambo, 9/28/93.

the fundamental problem of the traditional productions system being unsustainable, spatially consumptive, or environmentally destructive.

ANGAP has recommended that alternative technologies and practices be carried out as a response to human pressures on the protected area. One of the most important pressures in peripheral areas is forest lost due to agricultural incursion. The team observed several recent tavy fields that had pushed into park boundaries. The team encountered little evidence of efforts to identify and promote alternative technologies and production systems. To date most studies focus on understanding and improving the current system of production. They have described farmers' perceptions of their needs within that system. The question arises, and has been discussed among Andohahela project staff, within this inherently destructive system of rice production, rice marketing and cattle acquisition, is it realistic to think that increasing the productivity of this system will lead to <u>less</u> destruction? If farmers produce more paddy rice, as they would like to do, or have better yields in their tavy rice, will they stabilize their agricultural land? What about the zebu that they will buy with this increased rice production? Where will they graze these animals? Will they discontinue the practice of late burning for pasture management? It is to the project's credit that they are asking these questions. It will be to their advantage when they are able to confidently provide answers. The preparation of a Phase II design proposal for SAVEM encourages these issues to be developed in the form of hypotheses to be tested.

Development links to conservation are currently weak. Community development has used social works such as school construction, water supply, or health interventions. As "conservation technologies" they appear ineffectual. Linkages are not made and programs are not well-understood by villagers. This approach risks giving the impression that the project is trying to buy the goodwill of the population rather than instilling a sense of village ownership and concern about their environment. If such social programs are to work for conservation objectives, they will need to be better integrated with other ICDP activities.

Although project staff may present the message and the connections between environmental conservation and development activities, that message does not always take hold. The team interviewed villagers who had internalized some important environmental connections such as watershed protection links to rice production. We also interviewed other villagers who had no idea why an Operator was active in their village. There were examples from the Andohahela project where villagers said they would cease burning if the project would give them a dam. These cases should be studied to better understand what factors converge to establish desirable conceptual and behavioral linkages.

4. EVALUATION FINDINGS: PROGRAM IMPACT

The effort to preserve habitat toward the objective of biodiversity conservation is continual. Once an old growth forest is cleared, its loss is essentially permanent. With individual species the loss is absolute. The conservation and development grants that established a point of departure for Madagascar's protected areas program cannot be expected to have registered major impact on a problem whose success can only be measured on the very long time scale of evolutionary biology. CDIE seeks data on impact at three levels -- changes in practices affecting resource use, changes in the biophysical base, and changes in social and economic status that can be plausibly associated with improved resource management.

The team sought evidence that appropriate changes toward long term objective of conserving biodiversity had been initiated. The evaluation framework summarized in Appendix A argues that projects can be expected to have achieved changes in behavior or practices that lead to improved conservation of the targeted biological resources. In some cases evidence can be gathered, at least for limited areas, that behavioral changes are producing biophysical changes. The ICDP hypothesis assumes an important link between improved socio-economic conditions and conservation ,at least when local populations are empowered to make the right decisions. Determination and measurement of appropriate indicators had not been undertaken. As a result the team's observation with respect to socio-economic change are limited.

Impact on Practices

In order to achieve the ultimate goals of biodiversity protection and economic development, local people must first alter the habitat-destructive practices that have increased their economic vulnerability. Changes in farming and herding practices, adoption of reforestation, decreases in incursions into the reserve, cessation of blatantly consumptive practices in the reserve such as trapping and tree felling all constitute essential elements to realize conservation goals.

At the field or village level the USAID-financed program is still too young to have significantly changed villager's natural resource management strategies. As yet no alternative production technologies have been introduced on a scale large enough to have had a significant impact. Because the practices and associated impacts tend to be localized, the following section refers mainly to the findings from the team's visit to the Andohahela Integral Reserve.

People are aware of the Andohahela ICDP and the reserve, have begun to understand some basic environmental linkages, and

have modified their behavior, at least in part, according to that awareness, supportive staff, and the availability of alternative practices.

There were signs that the presence of APNs in particular have had an impact on destructive practices within protected areas and other forest reserves. APNs, project staff and DEF staff stated that the presence of APNs had slowed the rate of forest destruction in the Andohahela Reserve. Interviews with villagers reinforced the finding that they had heard the APNs and project staff's message that the reserve is off-limits. The team found that at least in some areas around the reserve, villagers have actually modified their practices to follow this message. It appears that an understanding and acceptance of the message is beginning to take hold.

The project has had its most significant impact on changes in human activities within the reserve. The team observed a diminution of activities such as herding and trapping in the reserve area. Direct observation covering the transect indicated in figures 1 and 2, revealed definite signs of reduced incursion into the park since the project began its activities. Interviews with villagers close by the reserve reinforced these observations. In the village of Ankazofotsy, for example, villagers explained that it was so illegal to go into the reserve (Parcel III) that even if a chicken or a cow entered the reserve a villager would have to wait for the animal to come out of its own accord. In reality, people do go into the reserve; however, the understanding and knowledge that the reserve is off-limits has certainly been established.

Finding villagers who have adopted new practices outside the reserve is more difficult. Although awareness of the reserve and its environmental role has been raised, the project has not introduced practical alternatives to current practices. Animal husbandry, water management, and gardening. None of these activities have been introduced widely enough or for a long enough period to have had an impact.

The one exception to this is in the area of tree planting and tree harvesting. Although tree planting is proceeding slowly, the fact that 50% of tree nursery production is going to private individuals is a sign that villagers are interested in planting trees. The project's interest in increasing this percentage and encouraging individual tree nurseries is also a sign that the emphasis will continue to move in this direction[5].

DEF officials stated that there has been a major increase in demand for cutting permits. An exact figure was not available, but

---

[5]. See Andohahela Project Progress Report covering the period Jan. 1-June 30, 1993. p. 6. 1993

the *Chef de Cantonnement* in Tolagnaro indicated an approximately 80% increase. In his opinion, interest in tree planting is directly linked to villagers' decisions to work within the system to obtaining cutting permits. In order to get a permit a villager is supposed to plant a tree. Thus, some participation in tree planting will facilitate getting a cutting permit. The team was unable to verify the extent to which villagers actually planted trees to get permits to cut larger trees.

Biophysical Impact

It is not yet possible to measure the biophysical impact of USAID's program at a national level. This is because, 1) field-level activities are still too new and too micro-site specific to have had a significant impact, 2) the requisite baseline surveys and studies have not yet been carried out that would permit monitoring and evaluation of changes in biophysical conditions in and around project areas, and 3) the links between appropriate measures to establish localized improvements (in forest cover or the presence or absence of indicator species) and the larger biodiversity strategy objective remain ill-defined. At the local level, specific interventions seem to be having (or not having) an effect on the environment.

> **At Andohahela, there is a noticeable (if not quantifiable) positive impact of the project on resources within the reserve. Incursions and destructive activities have diminished and this can be traced to various project activities both within and in the area surrounding the reserve.**

As mentioned above, some of the most evident project impact has been within the reserve itself. The team was able to conduct interviews and first-hand observations of the condition of the reserve and the level of human incursion - at least along the transect covered. The biophysical impact of less incursion into the reserve has left visible results. Quantification and measurement of these changes was not possible. It is also impractical to reach precise conclusions with respect to the swiftness of the reversal of negative trends compared to what might have occurred in the absence of the project. Pressure on resources in the reserve is less than in contiguous classified forests on the eastern slopes of Andohahela's Parcel 1.

> **Protected areas of forested lands have been stabilized with some limited exceptions.**

Boundary lines are clearly established and firebreaks are in the process of being completed. In those areas traversed by the CDIE study, they were completed. Incursion by villagers has dropped markedly, and with the exception of the tavy into area pasture land above the village of Mahamavo. Grazing in the protected area is

still going on, but recent droughts have reduced the number of cattle in the peripheral zones. Some felling of trees by honey hunters is taking place, but in general traditional use of the forest by villagers is not a major negative factor in the health of these forests.

The team saw overgrown paths and abandoned trap lines. Much of the transect was through the core area of intact forest with little obvious human disturbance. Guides who accompanied the team reported that canopy cover had previously been denser. According to villagers and project personnel, slash and burn agriculture, grazing, hunting, timbering and other destructive practices have greatly diminished within the reserve.

Finally, it must be mentioned that despite the considerable scientific research conducted in the past, they are not based on biological inventories or other factors which could be used a s basis form long term monitoring. Therefore, we can only hint at biophysical changes over ' .e. The project is just now starting to collect this essential ..seline data. SAVEM and other donors are beginning to finance the collection of requisite data. Once collected and analyzed the project can begin to measure the impact of its activities on the biological resources within the reserve.

Socio-economic Impact

The Debt-for-Nature Swap produced direct economic benefits for the country, but the overall impact of these benefits was insubstantial.

The $2.1 million reduction in Madagascar's foreign debt represents only a minute percentage of the national total. Its macro-economic impact is negligible. Of course, the program employs some 400 individuals, and the net impact of their efforts is better forest protection. The program thus has a positive long term impact, but this impact cannot yet be measured. Interviews with key informants universally credited APN's with improvements in park protection.

Given the extremely early and as yet unformulated nature of development activities in Andohahela, there have been little significant socio-economic impacts in the area.

Additionally, it must be remembered that the past two years of drought, famine and political turmoil effectively halted any forward progress that the project might have made in these areas. The fact that a minimum level of project activities continued at all is testament to the dedication of the project team.

This being said, are there any proxy indicators or signs of progress towards a significant socio-economic impact? If one views

changed attitudes and understanding as a necessary first step towards significant socio-economic changes, then it can be said that the project has achieved them.

Again, in the area of socio-economic impacts of USAID's program it is too early to detect any significant socio-economic changes at the village level or beyond. Changes in income, food security, employment (other than direct project employment) and other socio-economic indicators have simply not yet occurred except in a handful of cases. Whether or not there has been a negative socio-economic impact through increased efficiency in preventing incursions into protected areas would be hard to measure but an important question to ask.

In Tsimelahy, where the project completed construction of one dam, the project has had a socio-economic impact, albeit a negative one of dividing a community over unequal benefits from project activities. Nonetheless, the project staff seem to have learned from this experience (they learned even more during our focus group interview) in this village and are incorporating those lessons into their current design activities.

Although no conclusions can yet be drawn, there are some initial socio-economic issues related to the use of APNs from the villages for which they are responsible. There is an important and direct economic benefit to the village of one or more salaried workers[6]. Not only do APNs receive pay but, because they are tied to a project, they receive it regularly - a very important distinction from regular DEF employees whose paychecks are subject to long delays.

---

[6]. The importance of this was emphasized in an interview with the Village Chief of Ihazofotsy (whose 2 sons were APNs).

5. EVALUATION FINDINGS: PROGRAM PERFORMANCE

Program Efficiency

Development activities in the peripheral zones have not yet been substantial enough at this point to warrant an analysis of program efficiency.

Strategies linking conservation of the reserve to economic development in the periphery zone have been weak. Sporadic and somewhat haphazard "development" activities such as a dam, a one hectare village woodlot or a distribution of vegetable seeds have hardly produced benefits that could by themselves, justify the sizable investment in the country's protected area program. Consensus on what constitute valid benefits to stabilized park and protected area boundaries and modified patterns of resource use must be reached before appropriate economic tools and techniques for valuation can be refined and applied.

Economic tools, such as contingent valuations derived through measures of "willingness to pay" or "willingness to accept", can help sharpen the choices, but questions involving the survival of species, transgenerational time frames, and global strategic concerns call for new methods of examining program efficiency. It is not clear what data would be needed for a single reserve much less on how to compile such information across sites to distill a national profile which could be used to gauge program efficiency. The Andohahela Reserve, for example, protected an important watershed for the region's sisal industry and other uses. How does one ascribe a value to this function or others such as intellectual property rights which traditionally have been considered as externalities? SAVEM and KEPEM will help develop tools and data to address the measurement of program benefits, but the fundamental measure of success -- conservation of genetic resources, species, and ecosystems -- defies contemporary economics. Given the strategic importance and the global nature of preserving Madagascar's natural heritage, its present value is perhaps best reflected in the donors' and conservation NGOs' willingness to pay the costs of establishing the system and in the government's willingness to support a high proportion of public revenues being channelled into the sector.

Program Effectiveness

The current program covers only a limited number of the country's protected areas and none of the remaining non-protected natural areas.

According to ANGAP, the fourteen Priority 1 protected areas are, or will soon be, under operator managed ICDPs. Propositions for

Priority 2 and 3 areas are in the formative stages. Even if each ICDP is successful, many important examples of prime habitat will be lost. The current conservation approach needs more of a bioregional or landscape perspective to insure that all existing resources are subject to possible protection.

The hypothesis that conservation and development can be linked by improving livelihoods remains unproven, but if proven, the concentration on a limited number of protected areas may produce local and even regional inequalities. This tendency to concentrate the benefits may be offset by proactive strategies. ANGAP's intent to distribute ecotourism revenues in protected area programs to areas with low potential for tourism indicates systematic awareness of the need for sharing revenues and other benefits.

Equitable distribution of benefits to populations supporting protected area policies, important to creating a general association between the ICD project and the conservation objective, has proved difficult to implement.

In general terms, it is in the socio-economic aspects of project activities that one sees most clearly the evolution of the biodiversity protection model being applied in Madagascar. Up until 1991 traditional conservation groups (WWF, Missouri Botanical Garden, Conservation International, Xerxes Society, Jersey Wildlife Trust, Peregrine Society) were the only organizations involved in biological study and, on a more limited scale, in biodiversity protection. Even these groups have been in the country less than 10 years (with the exception of WWF which has had a presence dating back to 1979).

While some, notably Conservation International and WWF, are fairly large and diverse and have some experience in conservation and development, their mandates, staff and expertise is certainly not in the area of economic development. This shows clearly in early attempts at "development" around protected areas. Interventions were parachuted into villages with little to no understanding of village social and organizational structures. In some cases this has created divisions and ill will within villages (see Appendix B). In other cases it has created misunderstandings between villagers and project staff (see Groenfeld, 1990). The simple approach of giving the villagers what they said they wanted may have been expedient in the short term but has come back to haunt current projects as villagers expect gifts from projects in return for their "protection" (i.e., non-destruction) of the reserve or national park in question.

The gift-giving approach is a hurdle to overcome in current project preparation activities. Socio-economic surveys currently being conducted, or recently finished, that focus on asking villagers what they need risk reinforcing and elevating villager expectations of development "gifts" such as the dams and carts they

received in the past. This approach does not lead to the sustainable continuation of project development or conservation activities in the long run. It also avoids the difficult challenge of linking the conservation of resources within a protected area to the socio-economic development surrounding that area - the basis of integrated conservation and development projects.

The Andohahela project has completed a series of socio-economic studies and profiles of the thirteen pilot villages. There are other studies being conducted as well. Many of these surveys and studies have raised the expectations of villagers regarding project activities. In exchange for their heightened awareness and cessation of destructive activities they want something from the project - a dam, a school, a health center. This exchange of a project-supported development activity in return for changed behavior on the part of villagers can build on the traditional Malagasy practice of providing counterpart contributions in kind and in labor.

This practice of reciprocity was referred to often by APNs as the basis for development activities in areas where they were trying to raise awareness and gain the cooperation of villagers. There would seem to be a fine line between the gift giving projects of the past and development within a tradition of reciprocity and mutual aid. But, if the distinction can be made the project will be in a much better position to respond to villager needs with positive, sustainable approaches. Having learned some lessons from the past, the project is in a better position now to respond to villager-identified needs effectively. How the project deals with this situation will be absolutely critical to achieving a positive and sustainable socio-economic impact in the area.

Including women staff members in conservation and development activities appeared to increase the likelihood of success.

The lack of women project staff is a weakness in dealing with the various needs of villagers. The entire APN program, whether locally-funded operators agents or central Debt-Nature agents, neglected women. The team did not encounter a female APN. The Andohahela project has taken a small step to address this weakness in the hiring of eight young women to carry out surveys in the villages. This was done with a view to provide training and perhaps hiring these women to work with the project in some kind of field capacity. With respect to support institutions, there did not appear to be problems in bringing women into the ICDP model. ANGAP's staff, for example, included two women in key positions of responsibility.

Gender division of labor can make the link between conservation and development difficult to establish. In Ankazofotsy and Ihazofotsy, the two villages in which the team encountered VSF's small animal husbandry activities, the team sociologist remarked upon the fact that in the first village the task was carried out by

young men whereas in the second it was women. Generally, raising chickens is well within the woman's domain throughout Madagascar. To find young men carrying out this activity in Ankazofotsy was therefore somewhat surprising. Ankazofotsy was an Antanosy village while Ihazofotsy was the only Antandroy village in the project area. Given that the team saw a man pounding rice in another Antanosy village, again a task reserved for women throughout Madagascar, it may not be unusual for men to take on chicken raising. However, another explanation may be that, once a traditional female activity becomes an economic activity, Malagasy men may very well take it over. This is a situation well-worth following to see if women are being excluded from project benefits or if the above-mentioned gender roles simply do not apply in some villages in the project area. It is also a situation that underscores the importance of recruiting women project staff.

Program Sustainability and Replicability

By providing an ongoing and predictable source of funds, the DEF's Debt-for-Nature program used financial sustainability to enhance institutional commitment.

The debt-for-nature agreement in Madagascar was the first in the African region and differs substantially from all previous debt-swaps throughout the world. In the past, interest generated by a debt-swap had to be reimbursed to the US Government. However, a change in US law allowed local currency funds from debt-swaps to be invested and the interest earned used for project activities. In other words, the program's original intent of providing stop-gap support while identifying more sustainable means, has taken on longer term significance. The debt-for-nature program is now able to run most of its activities from accrued interest alone, and as a result support to the Ministry through this program will be maintained for a longer time.

Since 1990, with the support from the debt-for-nature program, nearly 400 nature protection agents have been recruited and equipped and funds have been made available to enable Forestry Agents to spend more time in the field. An in-service training program provides unique institutional support for the Malagasy government's efforts to protect the nation's environment is the only program in Madagascar that operates over the entire country.

Although not a panacea, the success of the first debt swap encouraged additional similar arrangements to support biodiversity conservation.

The Debt-for-Nature program has been integrated into the formal organization of the Water and Forests Department. The investment in organization and management systems provides an existing channel for

additional debt swap funds. For example, in 1991, WWF added an additional $.5 million to USAID's original investment.

Conservation International had submitted a $4 million proposal to the Grants Management Unit (now of ANGAP) which included a $1.4 million debt swap. Initiation of this swap was imminent. This funding will in part, provide an endowment for the Zahamena area in which conservation finance arrangements may become a model for other protected areas and ICDPs.

Debt swap programs provide a significant cushion from which specific programs can develop financial sustainability, but inflation and escalating program costs indicate that they may require more maintenance than initially envisioned.

The effectiveness of the Debt-for-Nature program can be measured by the effectiveness of APNs in the field in carrying out their tasks of awareness raising, reforestation, patrolling protected areas, fighting fires, etc. Their effectiveness, in turn, can be directly related to their level of training and their immediate DEF supervisors. In the area of training, it was the team's impression that, given the responsibilities placed on APNs, past training of one to two week a year is not sufficient and renders the APNs less effective than they might otherwise be if they were better trained. A recent evaluation of the Debt for Nature project brought up the problem of communication between Forestry Agents and APNs and between APNs and villagers. Communication, it stated, tended to be one way only, telling people what to do and not to do and not soliciting their input. APNs themselves asked for more training in this area as well as in the area of forestry legislation. The team heard and witnessed very different opinions of APNs that were directly attributed to the quality of their DEF supervisors.

Sustainability of the new DEF outreach capacity achieved through the use of "paraforestry agents" is uncertain. Do their services result in economic changes that merit commitment of GRM resources (national budget, forest funds, international loans) to their eventual financing. What is expected of the APN and what is his future? General development agent? The new Forestry Agent in the village? A holder of monthly meetings and planter of trees? Conflicting roles for village-based APNs need to be resolved. How and when can their contribution be meaningfully valued? With a multitude of empty posts and slim operating budgets, would funding APNs be the wisest use of additional funds? It may, for example, be more important to provide the means for APNs to serve their intended function of helping the DEF to diversify away from only being a regulatory agency to strengthen its outreach functions.

For the most part, international groups are not working in equal partnership with national NGOs and are therefore not assuring the continuity of operations in the long term.

It is often and correctly stated that there are only a few (2-3) Malagasy NGOs capable of working as even as junior partners with international NGOs on ICDPs. Except for the NGO SAF-FJKM, local NGOs do not yet have the capacity to assume lead or even equal partner roles in assuming operator roles in ICDPs. Development of local NGO capacity by ICDPs and international NGOs has been unsystematic and not always useful. Most of the well-established indigenous NGOs work in the agricultural areas on the Haut-Plateau and are at a loss when habitat preservation is the development objective. Although several have had success in rural development including village organization and natural resources management activities, they do not necessarily have the means or interest in moving into the more remote locations where most of the protected areas are located.

USAID needs to examine its current approach to NGO capacity building and develop coherent, effective and supportive training procedures. The involvement of other international NGOs who focus on NGO capacity building and who are not currently in the country would permit training for local NGOs and reinforce the current operators who, not being specialists in this arena, would benefit from some form of assistance.

COMODE appears to have adopted an institutional strategy which limits its coverage and ability to transfer and lessons from other countries' experiences.

This mission fit perfectly with the NGO-PVO/NRMS project concept. In general, COMODE has made progress in carrying out its mission. Where the project seems to have fallen short is in the area of facilitating international information exchange and encouraging such exchange within Madagascar. In spite of the fact that the NGO-PVO/NRMS project is being carried out through NGO consortia in three francophone countries (Madagascar, Cameroon, and Mali), the only gathering of members from these consortia have taken place in Uganda (the sole anglophone country of the project) and in Washington, D.C. There have been no other visits either by Malagasy NGO representatives to Mali or Cameroon, or by people from these countries to Madagascar.

Additionally, the glossy magazine that COMODE periodically produces, *Faribolana*, seems to have a very limited distribution within Madagascar (just to donors, some government officials and members). Outside Madagascar copies are sent to the NGO-PVO/NRMS project for distribution. COMODE staff knew of no outside links to international NGO networks or information exchange. The team was unable to determine if they even received publications from the other consortia support by NGO-PVO/NRMS. It would seem that an opportunity for information exchange and learning has been missed. USAID/Madagascar felt that the project fell short in providing training and institutional support to the COMODE's member organizations.

Thus far, ANGAP and the operator model has been largely donor driven, and has taken place with reluctant support from the DEF.

When planning and programming at the national level are overly donor driven, commitment and change in the country program may not be sustainable. While difficult to program, building broader consensus, especially among political decision makers, of the importance of dealing with environmental and natural resource issues will certainly contribute to a program's prospects for long term success. Support to civil organizations whose agenda includes environmental advocacy within a democratic forum could complement other means of policy dialogue. COMODE as a civil society institution has yet to fill this role from the NGO side. Support to the ONE and to the creation of a national endowment under the KEPEM program may offer an avenue to address the issue.

One of the advantages of working through an operators like WWF is that they bring non-USAID resources to bear on the project.

Between 1989 and 1992 when 417,000 FMG of PL480 funds destined for the Andohahela project, or over 75% of the funds budgeted, "disappeared", WWF was able to call upon its own resources to keep the project alive. Opening the protected area management system to multiple outside funding sources allow projects more flexibility to undertake activities that may not fit within USAID's program.

WWF has shown a commitment to the preservation of biodiversity in this country that goes beyond the life of a project and beyond donor funding. The question of sustainability needs to be examined in the long run. The post ICDP role of operators has not been fully defined, and operators did not appear to have systematic plans for phasing out. Operators are focussed more on the medium term. The next phase of USAID financing is only intended for a three year period, yet the program activities clearly require substantially longer commitment. That operators are thinking through this longer time frame indicates that at least the Andohahela project will extend beyond the limited period of financing envisioned under SAVEM.

The potential of ecotourism to enhance financial sustainability requires a longer lead time than expected.

Initial planning documents placed great hopes on ecotourism as an important vehicle for insuring biodiversity conservation. In practice ecotourism has yet to live up to its promise. The initial draft of the NEAP discussed at great length about the development of ecotourism and some of the investments that would need to be financed in order to realize its potential. Almost five years later, that potential is still far from realized, although tourism has grown in Madagascar. Recent analyses are more sanguine, but the consideration has been more at the macro-economic level than with

local biological conservation.

In fairness, 1991 and 1992 saw major setbacks to tourism with the general strikes and civil unrest. The Berenty Private Reserve in the south saw tourist numbers plunge from 8,000 to less than 2,000 during that period. The rebound to levels over 8,000 after this period may be an indication of the strong appeal of Madagascar to the international tourist. Madagascar can be marketed as a destination totally unique in the world. Nowhere else can tourists see the kinds of fauna or natural landscapes that Madagascar has to offer. Malagasy culture, music and traditions are also unique.

However, the infrastructure obstacles to increasing tourism are numerous and profound. Transportation, both international and domestic, communications, lodging and other tourist services are inadequate. These problems are beyond the scope of protected areas operators and must be resolved by the national government working with international donors and the private sector.

Structures are being put into place to capitalize on existing tourism for biodiversity protection. ANGAP started selling tickets for entrance into parks and reserves in mid-1992. Half of the proceeds from these sales will be distributed to communities around the protected areas, via the operators. Revenues from January through March 1993 totaled $9,300. Over fifty percent of the visitors were Malagasy.

The sociological benefits of recruiting APNs from their villages are also important.

In principal, APNs that are villagers themselves and not outsiders can encourage their fellow villagers to follow their example and protect the reserve of their own accord. Policing the reserve becomes an act of self-restraint and not imposed control and enforcement by outside agents. Although projects may have to accept a lower level of education in recruiting from some remote villages, the sociological distance inherent between villagers and more highly educated APNs might prove more of an hinderance than a help. There is, however, one potential sociological problem that village-recruited APNs may face: the problem of authority in traditional village society. Because of their youth (almost a prerequisite given the demanding nature of their work) and the fact that they live in the traditional world of the village they find themselves in an unnatural position of authority over their elders[7]. Additionally, the Andohahela project staff and survey

---

[7]. An APN in Isaka-Evondro said that this put him in an intolerable situation. Other APNs present during the interview agreed with him. By way of contrast, in Ankazofotsy a much older APN was referred to with respect by an older villager as "our mother and father".

workers commented that locally recruited APNs were very useful in helping them to carry out project surveys and studies. Well-known, local APNs could often solicit information and verify survey findings because of their knowledge of the community and the confidence community members had in them.

6. LESSONS LEARNED

Protected area management requires latitude for experimentation, thus the functions of coordination and control must not constrain individual protected area efforts to test specific approaches.

ANGAP is experiencing the inevitable growing pains of a new institution faced with a daunting task. Coordination and management - ANGAP's dual roles require a delicate balancing act that may take time to perfect. It is well within ANGAP's mandate, for example, to require reports from operators in an attempt to oversee the management of the national protected areas system. However, it is not in the spirit of ANGAP's coordinating role to make these reporting requirements excessively burdensome for the operators. It is equally undesirable to require operators to follow identical procedures in the design, execution and evaluation of protected areas projects.

The need for system-wide coordination and oversight is generally recognized. At the same time, latitude to test hypotheses requires a certain degree of autonomy on the part of operators. One of the most encouraging things about the team's visit to the Andohahela project area and conversations with project's staff was that, although mistakes had been made in the past, the lessons learned from these mistakes have been taken into account and are actively being addressed. Indeed, to lose this autonomy would be to lose one of the principal strengths of the current operator system - the ability to draw upon the diverse experience and expertise of independent organizations to devise locally appropriate interventions.

There is a fine line between effective coordination and control both between DEF and ANGAP, and ANGAP and operators. The necessary balance between control and coordination has not yet been struck.

For peripheral zone development to be successful, technical inputs need to be well thought out and well explained to villagers.

Early attempts at rural development activities around protected areas have been more important for the lessons learned from their implementation than for their actual beneficial impact on target populations or their environments. Inexperience of conservation NGOs with development activity and the sense of urgency to do something produced ineffective technical interventions. In the best cases they helped raise awareness, in the worst they were counterproductive. Interventions were carried out without adequate sociological or technical preparation and often resulted in misunderstandings on the part of villagers and frustration all around.

The need to incorporate local stakeholders into the design and

management of protected areas is important to the long term acceptance of a protected area by local residents.

Just as the theories and practices of rural development practitioners have evolved over the years, so too, have those of international conservationists. Throughout the world, and Madagascar has certainly been no exception, the initial forays of environmental groups into rural development and protected areas management have portrayed their inexperience in these fields and their willingness to learn and change.

This recognition has already lead to significant changes in personnel hiring practices, project preparation and design and staff outreach to villagers. The use of local villagers for outreach and oversight provides an important example. Operators, who for the most part came into protected areas management from a wildlife conservation orientation, have broadened their capacity either through employing advisors with technical development backgrounds or through teaming arrangements with organizations having such complementary skills.

Projects are now undertaking more comprehensive baseline surveys aimed at better understanding the range of villager activities and motivations. Project staff are taking a more critical and in-depth look at their overall approach to developing peripheral areas and at the possible consequences of their technical interventions.

Local level agents provide a cost-effective means of bringing about local participation in conservation and development programs.

The deterioration or absence of field-based forest protection and management, prevalent during the 1975 to 1990 period, is being offset by the placement of a system of locally based forestry outreach agents - APNs. The presence of these APNs in the field is having a positive impact in reducing incursions into and destruction of reserves. Due to their central mandate of awareness raising and education, and the policy of recruiting local people to fill APN posts, this control is being accomplished with minimal alienation of local populations and at modest expense. While differences do exist, this finding is valid for both Debt-for-Nature and Operator financed APNs.

7. OUTSTANDING ISSUES

Are protected areas, even if successfully protected, of an adequate size to preserve biodiversity?

Less than 2% of the country's terrestrial surface area is included in the protected area system, and this figure constitutes only about 10% of the remaining forest. In the other 90 percent outside the protected area system, forest clearing is proceeding more rapidly. Protected areas as "islands" are undoubtedly less effective at protecting biodiversity than when integrated into surrounding local and regional landscapes. Corridors, private reserves, natural and artificial forests and other habitat conservation strengthens the likelihood that genetic diversity will have the opportunity to evolve naturally.

The question of size of protected areas was brought to the fore in Barbour's discussion of "The Nature of Protected Areas in Madagascar" (1991, Annex L. He cites Leigh (1988) and states that,

> "...the evolution of Madagascar's fauna and flora was determined by the island's isolation and unusual size. A rich plant diversity and a high radiant evolution of small mammals make the preservation of biodiversity possible on relatively small areas. Few of Madagascar's animals require large ranges. While large integral tracts of land are always preferred from a biodiversity standpoint, the large tracts necessary to preserve large carnivores or other wide ranging animals may not be needed here."

He goes on to say that small reserves such as Nosy Mangabe, Andasibe, Beza Mahafaly and Betampona all appear to have stabilized or even improved biodiversity. Barbour argues for the appropriateness of applying a strict preservationist model in certain core zones of protected areas because complete protection does work in relatively small areas in Madagascar. Forest birds may be effective indicator species for measuring the minimum size necessary to maintain viable breeding populations and viability of forest ecosystems as a whole.

Moreover, protected areas cannot be managed in isolation. Their protection, in the face of mounting population pressures, depends on improved management of natural resources outside the protected areas. Primary among them the aging eucalyptus and pine plantations and classified forests. This necessitates a new look at DEF and its role in areas where there is potential to develop forested buffer zones. Private and public woodlots and managed natural forests can and should involve consideration for biodiversity among their objectives.

Integrated Conservation and Development - How Integrated?

One of the most difficult, and most controversial, aspects of the Integrated Conservation and Development Project's approach lies in the first word, "integrated." What constitutes the integration of these two, previously opposed, concepts? Attempts in Madagascar to provide answers to this question reveal just how difficult an issue it is. USAID's SAVEM project was designed, in large part, to identify and test a series of related hypotheses. The principal one is the assumption that, by integrating the economic development of areas surrounding protected areas with the conservation of the protected area itself, local people would see benefits from and so become active stewards of the protected area. But making these links between conservation and development is seldom straightforward.

There also continues to be controversy over the validity of the approach itself. While few would argue that the poverty of populations surrounding protected areas constitutes one of the greatest threats to those areas, there is disagreement over the most effective way to address this threat. Should projects focus on improving the standard of living of people surrounding the reserves and thereby risk increasing population pressures as people move into the area in search of improved services? Will improving agricultural production really decrease land pressure? Should there be efforts to encourage movement off the land by offering alternative livelihoods further away from protected areas? How much economic benefit can villagers derive from protected areas without compromising the biological integrity of those areas?

Closely linked to the above is the question of whether the ICDP model is in fact valid? Although all of the ICDPs are supposed to be actively testing this hypothesis, it remains to be seen whether the ICDPs, including Andohahela, are actually doing so or whether they have assumed its validity and are proceeding accordingly? ANGAP appears to be helping individual protected areas to articulate the specific hypothesis being tested and will increasingly insure that adequate monitoring takes place. At this point the stage setting process appears to be very successfully moving forward.

The link between conservation of biological resources in a protected area and development activities in the surrounding zone is not always obvious. Monitoring of in and out migration, reduced infant mortality, economic diversification away from destructive agricultural practices, employment growth outside the project area that could absorb excess population all concern the Andohahela National Project Director. Andohahela is at the point now where it must make strong efforts to make this link explicit, not only within the project but also in the minds of the local people. When this link does not exist, strategies must be developed to deal with it. It is only through a clear understanding of this connection on the part of all concerned that a repetition of past development

activities of one-time investments (like a school) in exchange for expected long-term behavior change can be avoided. What is needed is more of a landscape or regional development perspective in which the role of a given protected area can be seen in a larger context than just protected area buffer zone.

Local NGOs - Operators of the Future?

USAID and other donors have placed high expectations on Malagasy NGOs. The GMU and COMODE were designed largely to strengthen local NGOs. Both misjudged the capacity of local NGOs in their project designs, and both have had minimal impact on the status of local NGOs. Because of upheaval in the country's largest conservation and development NGO, SAFAFI, the situation may be worse than previously.

USAID, ANGAP and the operators need to continue rethinking their approach to local NGO partnerships and institutional development. The development of local NGO capacity in conservation and development is too important to leave it to "osmosis". A more comprehensive strategy needs to be developed that would include training and soliciting the involvement of other international NGOs not currently in the country who focus on NGO capacity building. International NGOs currently in the country could benefit from assistance in NGO capacity building, but they may feel that they are already stretched thin enough in technical areas to take on this new activity.

Continuity of Operations and Continuity of Operators

It was not clear how operators were chosen and once chosen how long they were to stay, and/or under what circumstances their agreements would be suspended. The donor and government assumption that operators are working in partnership with national NGOs and are therefore assuring the continuity of operations in the long term was not born out by the field observations. In addition, as has been mentioned earlier, the current international NGOs in Madagascar have not shown comparative expertise in the area of institutional development. In the few years since the conservation through development projects were launched, some international NGO operators have left Madagascar even as new ones arrived.

The project format and duration of protected areas management functions is very ambiguous. Formal license agreements of specified duration might help operators to better define programs, but funding commitments do not match necessary periods. The fact that most operators have multiple funding sources has helped insure continuity. The potential role of local funds such as endowments, counterpart funds, NFF could be explored further following Conservation International's example in Zahamena.

Once endowed, it needs to be explored whether ICDP staffs might constitute themselves into local NGOs thereby assuring a long-term commitment of expertise to conservation through development while simultaneously creating an orderly means for international operators to scale back or phase out. In any event, the legitimate role of the state in providing enabling policies, institutions, and complementary programs remains to be defined.

APPENDIX A

EVALUATION METHODOLOGY

CDIE assessments of environmental programs are aimed at answering two central questions: "Has USAID made a difference?" and, if so "How well did it do it?" The central hypothesis of the environmental assessments is that USAID, through the right mix of program strategies, can impact on local conditions and practices to produce favorable long-lasting changes in the bio-physical environment and on the socio-economic welfare of cooperating countries. This Appendix describes the process used to test this hypothesis in USAID programs aimed at protecting biological diversity.

Impact - How much?

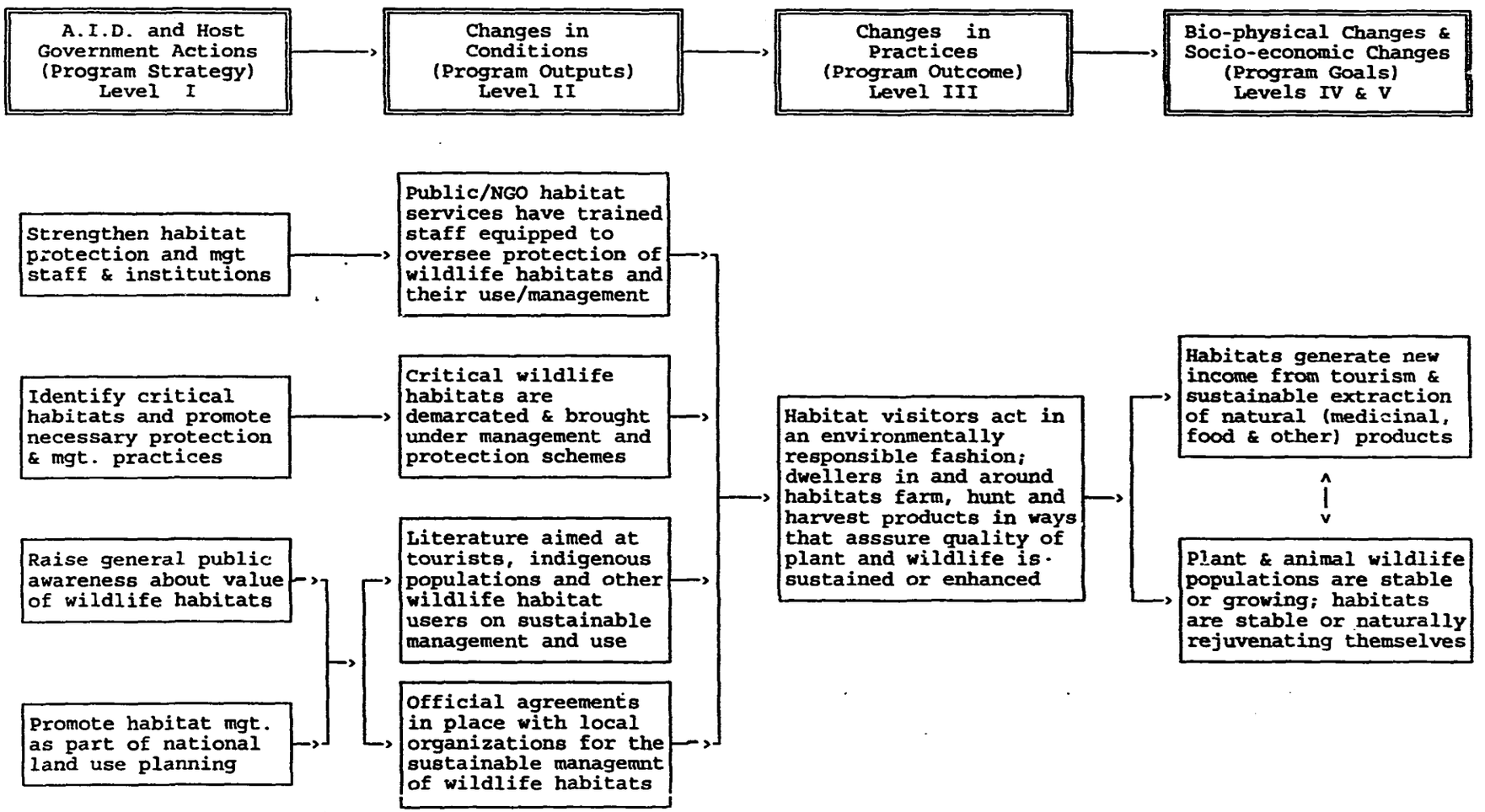
The assessment seeks to establish plausible associations between USAID program strategies or activities and the benefits to the human population which result from improved environmental quality and better natural resource management. In answering the first question, "Did USAID make a difference?", the assessment has attempted to document what happened or can be expected to happen from USAID assistance. The evaluation examines the relationships between environmental impact and USAID program investments using a five-level analytical framework (See Figure A-1.)

In the assessment framework, **Level I** describes the **"program strategies"** that USAID and the host government employed to conserve biological diversity through forest and marine habitat protection programs. These strategies include: strengthen habitat protection and management staff and institutions, identify critical habitats and promote necessary protection and management practices, raise general public awareness about value of wildlife habitats, and promote habitat management as part of a national land use planning.

The information is collected and organized in terms of four, cross-cutting strategies employed by USAID: 1) strengthening institutional capacity; 2) introducing technological change 3) fostering environmental education and awareness; and 4) adopting environmentally sound economic, regulatory, and tenure policies. The operating hypothesis is that by successfully carrying out development programs that create enabling conditions in these areas or by successfully recognizing and building on pre-existing conditions, meaningful progress toward the conservation of biological diversity will be made.

Figure A-1: Framework for Assessing USAID Bio-Diverisity Protection Programs

(Focus of Forest and Marine Wildlife Habitats)



FRSTLOGC.PRK::28/MAR/94

At **Level II, "program outputs"** are the conditions that have resulted from implementing these strategies. Examples include: public agencies or NGOs services have trained staff equipped to oversee protection of wildlife habitats and their use/management, critical wildlife habitats are demarcated and brought under management and protection schemes, literature is published and disseminated to tourists, indigenous populations and other wildlife habitat users on sustainable management, or official agreements are in place with local organizations for the sustainable management of wildlife habitats.

The **Level III "program outcomes"** resulting from changes in Level II conditions are the adoption of practices and technologies by target groups. Such changes in practice include: habitat visitors conduct themselves in an environmentally responsible fashion, dwellers in and around habitats farm, hunt, and harvest products in ways that assure quality of plant and wildlife is sustained or enhanced.

Level IV and V "program goals" constitute the biophysical and socio-economic changes expected to result from the adoption of Level III program outcomes or practices. Level IV and Level V goals can be viewed as mutually supportive; each contributes to the sustainability of the other (and in many respects each flowing from the other.)

For the purposes of the evaluation, **Level IV "bio-physical goals"** are the specific environmental objectives of the program being assessed. Level IV indicators measure environmental conditions and biophysical changes that contribute to producing the strategic objective. Such changes would include: plant and animal wildlife populations are stable or growing, or habitats are stable or naturally rejuvenating themselves.

Level V "socio-economic goals" represent the development goals and are generally associated with sustainable increases in income, profits, remunerative employment, overall well-being, or production. While access to income data is difficult, the continued involvement of beneficiaries in the program can be used as a "vote with their feet" proxy indicators of improved farm incomes and profits, at least at the time of the evaluation.

Performance Scales: How well?

In answering the second question, "How well?", CDIE's primary concern is the **efficiency, effectiveness, sustainability** and **replicability** of the program.

Where data exist, the evaluation measures program **efficiency** by using monetary estimates of the flow of benefits to calculate an economic rate of return for those USAID and host government program

investments to which benefits can reasonably be attributed. Because benefits occur into the extended future, their value must be annualized and adjusted to net out all costs and expressed as a discounted net present value to compare with project investment.

To assess program **effectiveness**, the evaluation examines how well USAID sponsored techniques or services are reaching intended target groups and whether there is equity or bias in access and participation by these groups. Examples of effectiveness indicators include the make-up of participating groups according to resource endowments and social status (e.g., farm size, gender)

The examination of **sustainability** is important at all program levels (See Figure A-1). Evidence of sustainability includes the continuation of activities, regulations, or institutions beyond the termination of USAID technical and financial assistance either on their own "internal" momentum or with host government or other donor assistance.

To determine the **replicability** the evaluation examines whether conditions and practices, promoted by the program, have spontaneously spread beyond the target areas. This spread may occur among participants by "word of mouth" or other means without further outside support, or "induced" by public, private or donor agencies which have picked up on a USAID supported concept. Replicability indicators include the number of similar activities supported by local or international agencies outside the program target area and population; number of participants outside the target area that have adopted in sum or in part USAID sponsored practices.

This longer term perspective is both more strategic and programmatic in nature than a project evaluation. The focus is on impact and not implementation. As such the team has focussed its data collection where **outcomes** of the various intervention strategies employed are sufficiently advanced. Specifically, the team examined USAID support to the biodiversity conservation component of Madagascar's Environmental Action Plan through:

support to the testing and evolution of viable field based approaches to protecting biodiversity in Priority One protected areas via funding support to relatively autonomous park management "operators" (WWF/Andohahela Project as illustrative case study);

the Debt-for-Nature Swap that has permitted the DEF to develop an increased outreach capacity and the possibility of transcending its narrow policing functions with respect to state forests and wood product markets;

the institutional component of the SAVEM project that provided for the creation of ANGAP;

the effort to strengthen indigenous NGO capacity via centrally funded support to COMODE.

Systematic effort is made to segregate the USAID contribution from other factors in the overall context.

Data collection procedures

CDIE employs a variety of primary and secondary sources of data to: construct the chain of events linking program activities and to impacts; examine major evaluation issues; and identify lessons learned.

In preparation for the field work CDIE collected and analyzed relevant secondary data and information that are available in Washington or in host countries from a range of sources including project documents, technical reports, and special studies (available with the Agency's Development Information System).

CDIE's fieldwork methods combine an examination of changed and changing conditions at the national policy, planning and institutional levels with a more in-depth evaluation of one case where a site-specific protected area program has been operating with USAID support. Data collection methods included key informant, focus group and informal interviews, direct observation and analysis of secondary sources

Evaluation data collected in the field will form the basis for a country case study synthesizing lessons learned from USAID programs in fostering conservation of biological diversity through protection and management of protected forest and marine habitats. The case study experience will in turn contribute a global assessment of USAID biological diversity.

In addition to a review of program and project documentation (see bibliography of all documents cited in this assessment), data collection includes field visits to document implementation efforts. These include non-statistical evaluation of the biophysical state of habitats under improved management practices and a comparison of conditions in areas that have not experienced USAID supported interventions.

Following each field site visit, participating team members gather to discuss their findings. A structured checklist is applied to these discussions to ensure team consensus on key points related to program performance. In addition, the team develops a roster of key technical, institutional, social and economic indicators for evaluating program impact at each site. The team members use this roster to strengthen their consensus on the assessment of the field site. The consensus building checklist and the key indicators lists are attached in the following pages.

CDIE's approach to the fieldwork in Madagascar combines an examination of changed and changing conditions at the national policy, planning and institutional levels with a more in-depth evaluation of one case where a site-specific protected area program has been operating with USAID support. This evaluation considers both national level programmatic support and a specific local level conservation and development project designed to preserve biodiversity in the Andohahela Integral Natural Reserve. Certain unique features notwithstanding, Andohahela reflects the general evolution of Madagascar's approach to protected area programs and serves as CDIE's principal field site. Integrated Conservation and Development Projects do not exist in a vacuum, and the establishment of a supportive policy and institutional context has already received USAID support through a number of other funding mechanisms. These efforts were too young to receive comprehensive review by the CDIE team.

The team spent four weeks in country collecting data related to the above program components. The thrust of this data collection effort has been to assess changes in the country's program for the protection and management of biodiversity that have been engendered through USAID-supported conservation and development activities. The team spent over one week in the environs of the Andohahela Integral Natural Reserve. The remainder of the time was in Antananarivo and its surroundings. Data collection methods included key informant, focus group and informal interviews, direct observation and analysis of secondary sources

Three broad categories of informants were targeted and more than 64 interviews were carried out. Of the 64, 19 were with USAID and host country government (and ANGAP) officials, 28 were with program implementors (operators, project staffs, DEF outreach staff), and 17 were with project beneficiaries. Of the total 12 were structured or focus group interviews, 27 were directed key informant interviews and 25 were more open ended informal interviews.

The team spent nine days in and around the Integrated Natural Reserve of Andohahela. Visits were also made to the private reserve of Berenty, the forest station of Mandena and villages near the classified forest of Tsitongambarika. Interviews were conducted with WWF and VSF project staff, expatriate researchers, host country government officials and villagers. Interview methods ranged from structured, group interviews to key informant interviews to informal interviews. During villager and APN interviews the team relied on various WWF staff and, even more importantly, our Malagasy team anthropologist for translation and interpretation. Interviews were conducted in ten villages in the region, Berenty and Taolanaro.

The team was aided greatly in its work by WWF project staff who put vehicles, drivers and staff at our disposal throughout our time in the region. WWF staff traveled with us for the first several days of our field visit. At other times we worked with WWF and VSF

survey teams in the field. Our visits to the forest station of Mandena and the classified forest of Tsitongambarika were made with the DEF *Chef de Cantonnement* of Taolanaro and several APNs under his authority.

Evaluation data collected in Madagascar will form the basis for a country report synthesizing lessons learned in fostering sustainable forest management practices through USAID supported activities. The Madagascar experience will in turn contribute to the overall assessment environmental programs that USAID has supported globally.

Biodiversity Conservation Site Assessment Checklist

A. Institution building

1. Evidence of an increased ability by government personnel to implement biodiversity conservation.

2. Evidence of an ability by user groups to implement biodiversity conservation.

3. NGO's - Evidence of an increased ability by NGO's to assist in the implementation of biodiversity conservation.

B. Awareness, Education and Advocacy

1. Evidence of educational/awareness programs being carried out in the project areas.

2. Evidence of an increased level of awareness of biodiversity conservation by villagers.

3. Evidence of villager advocacy for extension of biodiversity conservation.

C. Impact on Practices - A description of biodiversity conservation practices.

1. User group organization.

2. Methods of protection.

3. Methods of harvest and product distribution.

4. Description of sanctions.

D. Socio-economic impacts

1. Evidence of increased benefits to the community.

2. Evidence of increased benefits to individual user group members.

3. Evidence of development activity funded through the sale of community forest products.

E. Program effectiveness

1. Evidence of equitability (cast, tribal, proximity) in the management of the habitat.

60

2. Evidence of the addressing of gender concerns in habitat management.

E. Program Sustainability

1. Description of the external inputs provided in establishing and managing the habitat.

2. Description of the external inputs that are perceived to be necessary to future biodiversity conservation management.

3. Team's assessment of the sustainability of the biodiversity conservation efforts.

4. Continuation of government inputs.

5. Continuation of NGO inputs.

6. Sustainability of the Users group (economic and institutional).

7. Sustainability of the resource under management.

G. Replicability

1. Evidence of program replication beyond project input sponsored areas.

2. Evidence of increased participation of villages within project sponsored areas.

KEY PROGRAM IMPACT INDICATORS LIST

Field Visit Site: _____ Date: _____

Technical Indicators[1]

__ Years habitat has been officially protected.

__ Habitat size, perimeter length.

__ Miles of internal roads.

__ Miles of internal trails.

Social Indicators

__ Representative membership of all stakeholders. How participatory has the process of Habitat User Group (HUG) formation and function been?

__ Local leadership. How representative of the community is HUG leadership?

__ Quality of HUG Leadership. How involved and committed to the success of the HUG is the leadership?

__ Extent of women's involvement. How extensive has been women's involvement in the function of the HUG?

__ Sense of stewardship/responsibility for resource. How developed is the sense of "ownership" among stakeholders for the resource?

__ Incentives for participation. How extensive and enduring are the incentives for stakeholders to participate in HUG?

Institutional Indicators

__ HUG origins. To what extent was the HUG formed from the "bottom up"?

__ Security of rights. How secure are the rights of stakeholders to their resources? To what extent to the stakeholders understand their rights?

---

[1] Ranking: 3=High; 2=Moderate; 1=Low

___ Planning. If the HUG has an operational plan, to what extent is the operational plan collectively derived and understandable to all stakeholders?

___ Training. To what extent did/does project staff/government staff provide training to HUG members in development of operational plan and HUG management?

___ Technical Support. What is the level of technical support available to the HUG (e.g., from Line Departments, form project)?

Economic Indicators

___ Changes in land use/resource use patterns. Extent to which project inputs have affected existing land use/resource use patterns.

___ Benefits/Costs. How do the benefits of project/HMG inputs compare to the cost of the project inputs?

___ Cost effectiveness. Extent to which project/HMG inputs incorporated low cost local resources.

___ Changing employment patterns. Extent to which local employment opportunities have improved as a result to project/HMG inputs.

___ Improved markets. Extent to which project/HMG inputs have improved marketing opportunities for beneficiaries.

___ Sustainability. Extent to which project/HMG benefits are likely to continue when project inputs are completed.

Tourism and Hotel Operators Questionnaire

1. Name and Position of Interviewee:
   a. How did he or she enter hotel business?

2. Name of establishment:

3. Number of rooms
   a. Electricity Yes___; No___. River view: Yes___; No___.

4. Date Established:

5. Rate per night:

6. What do tourists request most from the guides (to see)?

7. What do you do to better educate the tourists about the forests, the wildlife, and the local people?

8. What does the hotel do to influence the impact on the park?

9. Overall, do you think the tourist business has a positive or negative impact on the

a. vegetation of the park
b. Wildlife resources in the park
c. On the environment outside the park

10. What could the government do to help hotel owners become better partners in managing the park?

11. Describe your experiences with:

a. anti-poaching units
b. Army patrols
c. guests' encounters with poachers

12. Have you learned about conservation? If so, how?

13. What controls or regulations (including changes) would enable Sauraha to develop as a desirable destination for tourists?

P-APP-A.MAD05/15/94:PWS

APPENDIX B

BIODIVERSITY AND ITS CONSERVATION IN MADAGASCAR

Biological Resources

The world's fourth largest island, Madagascar is biologically a continent unto itself. Its isolation from mainland Africa during a northward drift through the Indian Ocean for 70 million years has left the country with many endemic plants and animals. These include 100 percent of its lemurs; 95 percent of birds; 95 percent of reptiles (two-thirds of the worlds' chameleon species); and 85 percent of almost 1,200 kinds of plants. (World Bank 1988)

Once lushly forested, Madagascar was known as the "green island." At least 80 percent of the forests have been stripped way--most of them since 1950. Now the so-called "red island" is distinguished by the world's highest erosion rates. The island's unstable soils and pelting cyclonic rains exacerbate the effects of deforestation (World Bank 1988). *Lavaka*, one of the most spectacular kinds of erosion, occurs in the ferruginous soils, particularly on the leveled-off surfaces of the western mountain slopes. Although *lavaka* can develop naturally on these slopes, deforestation has accelerated the process.

The potential benefits of successfully protecting the island's biological resources are immeasurable. Agriculture, dependent upon the water-regulating capacities of many protected forested areas, employs 85 percent of work force, accounts for 35 percent of GDP and 80 percent of foreign currency income.

The beautiful coasts and inland scenery, the rich culture and its arts and crafts, have great potential for nature tourism. Yet, this industry currently represents less than one percent of the GNP (World Bank 1988). Madagascar's draw is its array of forest plants and animals. The growth of tourism from 12,000 visitors in 1984 to 40,000 in 1990 is based almost entirely on ecotourism. The potential value of this ecotourism, with 200,000 visitors projected by the year 2000, is considerable if Madagascar's protected habitats can be preserved.

Environmental degradation already costs the country between $100 and $300 million annually (USAID N.d.). The economic cost of lower agricultural productivity due to soil loss, and the need to rebuild the crumbling infrastructure equals 5 to 15 percent of Madagascar's GNP annually.

Threats to Resources

Most protected areas are threatened by the livelihood needs of local people -- for agricultural land, charcoal and fuelwood extraction, and poaching. Enforcement, without alternative livelihood opportunities, would create strong negative sentiment toward reserves and would increase hardships of Madagascar's rural poor, already among the poorest in the world.

The need for cleared, agricultural land in densely populated areas is the greatest threat to protected areas. Although, Madagascar is sparsely populated by African standards with just over 10 million (now estimated at 12 million) inhabitants and an average density of 17.5 inhabitants per square kilometer, at least sixty percent of the people live in less than a quarter of the total area (World Bank 1988). In these areas density often exceeds 80 inhabitants per square kilometer, reaching 200-300 in some valleys. This uneven distribution of people and the concentrated demand for land result in subdivided farming plots inadequate for a single family's subsistence. When farmers cultivate new areas, they usually head toward the well-watered land adjacent to the parks (World Bank 1988).

These areas also contribute to the livelihoods of charcoal makers and poachers, as well as noncommercial harvesters of wood for local or urban markets (Barbour 1992). Fuelwood and charcoal are the primary fuel for most of the country, with annual charcoal sales equaling approximately US$ 27.5 million annually. The value of wood transactions per year (timber, fuelwood and charcoal) is approximately US $250 million, or the equivalent of approximately 10% of GDP.

While much environmental damage has occurred in the last forty years, Madagascar has a long history of destructive practices. Madagascar's population descended from successive migrations from the East (most likely Indonesia) and from Africa beginning in the 5th Century AD. However, despite traditional sanctions against deforestation in some areas of pre-colonial Madagascar, this immigration contributed to the longstanding problem of habitat destruction on the island.

The early Malagasy pioneers were responsible for the extinction of up to a dozen species of the large, flightless moa-like elephant birds. These included the heaviest birds of recent geological history, *Aepyornis maximus*, a feathered giant almost 3 meters tall with massive legs. Its eggs, the size of soccer balls, can still be pieced together from fragments piled around Malagasy archaeological sites. Also erased were seven of the seventeen genera of lemurs -- one tree-climbing type, resembling a koala, was as big as a gorilla -- an aardvark, a pygmy hippopotamus, and two huge land tortoises. Currently, IUCN lists 12 endangered and 12 vulnerable species of lemurs.

Conservation Efforts: Policy and Planning

Since adoption of a national conservation strategy in 1984, environmental awareness has increased and several productive conservation schemes have been launched. However, these modest initiatives, dwarfed by the magnitude of the country's environmental and economic problems, fell short of expectations. The government forestry department, after drastic declines through the 1970s and 1980s, barely existed. The quality of protected areas eroded as the number of field agents declined. In 1988 the investment budget for Madagascar's entire protected area system was under US $1,000 (World Bank 1988).

In 1988, under the auspices of the World Bank and with funding from A.I.D., Madagascar produced a broad-ranging Environmental Action Plan (EAP) to improve conservation, resource management, rural and urban living conditions, and human and institutional resources. The plan clearly emphasized biological diversity. An integration of conservation and development was designated as the best approach for saving the island's vanishing habitats (World Bank 1988).

The EAP focused on several areas: biodiversity protection and management, combined with "adventure" tourism; creation of a national environmental fund for both rural and urban improvement projects; land mapping and management; environmental education, training, and sensitization; and institutional support.

Conservation Efforts: The Protected Area System

The administration and management of the protected area system is the responsibility of the Forest Ecosystems Service within the Department of Water and Forests (Direction des Eaux et Forêts) which comes under the Ministry of State for Rural Development. The Department of Water and Forests is also responsible for forests and freshwater fisheries, while other departments within the same Ministry deal with marine fisheries and agriculture. (World Conservation Union 1991). The authority for the day to day coordination of the Protected Areas Program has been devolved to ANGAP. The terms of this devolution are clarified as the program is implemented and revised through a series of annual agreements.

In priniciple, each strict nature reserve has a station for a deputy forester and each station is divided into two or three sectors under the responsibility of auxiliaries. In practice, adequate numbers of staff have not been available to ensure effective protection. (World Conservation Union 1991) Special reserves do not have supervisory personnel. Permits for entry to parks and reserves were obtained from the Department of Water and Forests in Antananarivo but this service has been transferred to ANGAP which coordinates the system through multiple points of sale.

The Forest Service generally lacks equipment and urgently requires vehicles, field equipment and uniforms for its staff, as well as large increases in it field staff (currently each "agent" covers some 25,000ha). The Debt-for Nature program has helped to increase outreach and contact. Protection of classified forests and reforestation areas is particularly uncertain because of the lack of resources. Without major donor support, the budget is not sufficient to staff much less manage the protected areas system adequately. (World Conservation Union 1991) Many of the protected areas require immediate, improved protection. Other sites await designation and inclusion in the system. As reported in the body of this paper, ANGAP and the operators it coordinates have begun to fill the void left by the moribund government infrastructure.

The **rainforests**, both lowland and montane, of the eastern side of Madagascar, are a particularly important center for species endemism. Some high priority protected areas already exist, especially the Integral Reserves of Zahamena, Andringitra, Marojejy and Parcel 1 of Andohahela, as well as the very large Midongy du Sud Classified Forest in the South. Some, smaller, but still important reserves in the eastern forest zone include the Special Reserves of Anjanaharibe Sud, Kalambatritra, Manombo, Nosy Mangabe, and perinet-Analamazaotra.

In the far north of the country, there are some **wet forests** that are somewhat different biologically from those in the east. Of particular interest are the Montagne d'Ambre National Park and the nearby Forêt d'Ambre Special Reserve, the Tsaratanana Integral Reserve, the Analamera, Manongarivo and Ankarana Special Reserves, and the small Lokobe Integral Reserve on the Island of Nosy Be. Each of these areas is of biological interest.

In the west of the country, the forest is of a **drier, deciduous** type. Of particular interest are the Isalo National Park (now seriously degraded), the Integral Reserves of Ankarafantsika, Tsingy de Namoroka, and Tsingy de Bemeraha, and the Zombitse Classified Forest (under severe threat at the time of writing).

Almost all the original vegetation of the **central plateau** of Madagascar has been destroyed. Three small relics of this forest are in particular need of protection: the Ambohitantely Special Reserve, the Anjorozobe Forest and the small vestige at the Manjakatompo Forest Station.

In the south and southwest of Madagascar is an extraordinary vegetation formation of **succulent and spine plants** in a semi-arid environment. However, the total area of the "spiny forest" protected remains a very small proportion of the total. Two important sites in need of more protection are Hatokaliosty and the area around Lake Ihotry.

Other areas which require more attention include: the riverine forests in the south and southwest, important lakes and wetlands, and other marine habitats and ecosystems including corals reefs and the northwest. (Stuart N.d.)

Table B-1

Summary of Protected Areas *

Name of area		Area (ha)	Year notified
National Parks			
1	Isalo	81,540	1962
2	Mananara Marine	1,000	1989
3	Mananara Terrestrial	23,000	1990
4	Mantadia	10,00	1989
5	Montagne d'Ambre	18,200	1958
6	Ranomafana	37,567	1991
Strict Nature Reserves			
7	Andohahela	76,020	1939
8	Andringitra	31,160	1927
9	Ankarafantsika	60,520	1927
10	Betampona	2,228	1927
11	Marojejy	60,150	1952
12	Tsaratanana	48,622	1927
13	Tsimanampetsotsa	43,200	1927
14	Tsingy de Bemaraha	152,000	1927
15	Tsingy de Namoroka	21,742	1927
16	Zahamena	73,160	1927
Special Reserves			
17	Ambatovaky	60,050	1958
18	Ambohijanahary	24,750	1958
19	Ambohitantely	5,600	1982
20	Analamerana	34,700	1956
21	Andranomena	6,420	1958
22	Anjanaharibe-Sud	32,100	1958
23	Ankarana	18,220	1956
24	Bemarivo	11,570	1956
25	Bora	4,780	1956
26	Cap Sainte Marie	1,750	1962
27	Foret d'Ambre	4,810	1958

28	Kalambatritra	28,250	1959
29	Kasijy	18,800	1956
30	Mangerivola	11,900	1958
31	Maningozo	7,900	1956
32	Manombo	5,020	1962
33	Manongarivo	35,250	1956
34	Marotandrano	42,200	1956
35	Nosy Mangabe	520	1965
36	Pic d'Ivohibe	3,450	1964
37	Tampoketsa d'Analamaitso	17,150	1958
Hunting Reserve			
38	Lac Kinkony	15,000	1972
Other area			
44	Lac Itasy	3,500	

Source: World Conservation Union 1991.

* Locations of Protected Areas are shown in accompanying map.

P-APP-B.MAD=5/15/94:FWS

APPENDIX C

PROTECTED AREA PROFILE: ANDOHAHELA INTEGRATED NATURE RESERVE

Andohahela Integrted Nature Reserve

IUCN Management Category: I Strict Nature Reserve

Biogeography: Malagasy rain forest

Location: 40 km north-west of Taolanaro in southernmost Madagascar.

History: 11 June 1939. The area of the reserve was increased from 30,000ha on 1 June 1966.

Area: 76,000 ha, in three noncontiguous blocks. Parcel 1: 63,100ha, Parcel 2: 12,420ha; Parcel 3: 500 ha.

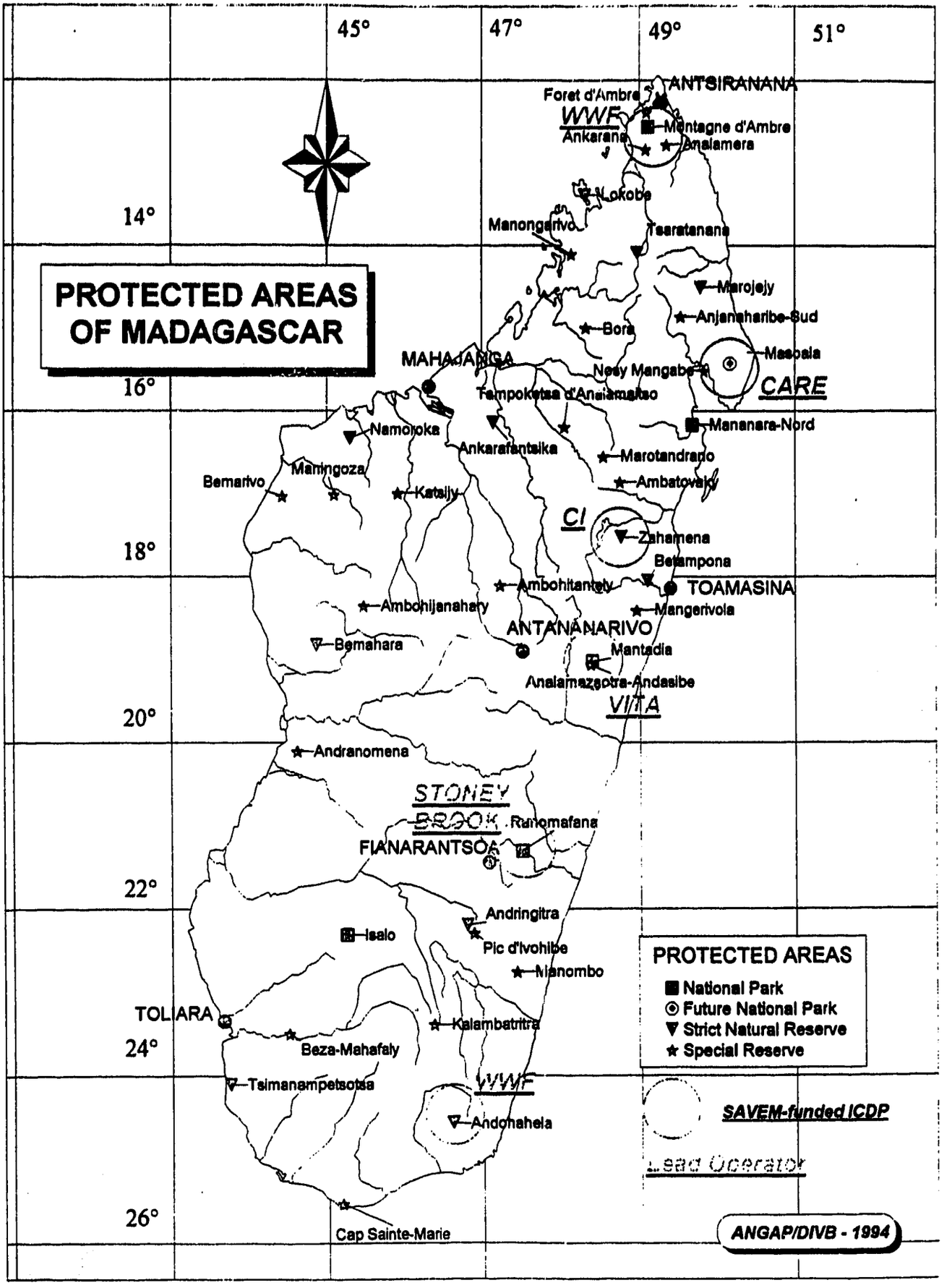
Land Tenure: Government

Management: The reserve is under the jurisdiction of the Nature Conservation Service within the Directory of Waters and Forests of the Ministry of Animal Husbandry, Waters, and Forests.

Altitude: 1000-1,956 m

Physical Features: Parcel 1: varies in altitude from 100 m to 1,956 m (Pic d'Andohahela); Parcel 2: from about 110 m to 1,005 (Pic de Vohidagoro); Parcel 3: about 125 m.

Climate: Parcel 1: humid, with rainfall of 1500-2000mm, no dry season and mean anneal temperature of about 23 degrees c; Parcel 2: much drier, with rainfall usually lower than 500mm per annum and a dry season of five-six months. Parcel 1: an important watershed, containing the source of over ten rivers, including the Mananara, rising at Anpamosira and flowing westward and the Manampanihy flowing east from Vohibe. The Mananara, which flows along the northern boundaries of Parcel 2, is the only permanent water source for that part of the reserve.


PROTECTED AREAS OF MADAGASCAR
45°
47°
49°
51°
14°
16°
18°
20°
22°
24°
26°
ANTSIRANANA
Foret d'Ambre
WWF
Ankarana
Montagne d'Ambre
Analamera
Lokobe
Manongarivo
Tsaratanana
Marojejy
Anjanaharibe-Sud
Bora
Masoala
MAHAJANGA
Nosy Mangabe
CARE
Tampoketsa d'Analamaitso
Mananara-Nord
Namoroka
Ankarafantsika
Marotandrano
Maningoza
Bemarivo
Katsily
Ambatovaky
CI
Zahamena
Betampona
Ambohitantely
TOAMASINA
Ambohijanahary
Mangerivola
ANTANANARIVO
Bemahara
Mantadia
Analamazaotra-Andasibe
VITA
Andranomena
STONEY BROOK
Ranomafana
FIANARANTSOA
Andringitra
Isalo
Pic d'Ivohibe
Ivohibe
TOLIARA
Kalambatritra
Beza-Mahafaly
Tsimanampetsotsa
WWF
Andohahela
Cap Sainte-Marie
PROTECTED AREAS
National Park
Future National Park
Strict Natural Reserve
Special Reserve
SAVEM-funded ICDP
Lead Operator
ANGAP/DIVB - 1994

I. Introduction

The protected areas system of Madagascar covers an incredibly diverse, and lamentably small, fraction of the country's biological resources. From spiny desert in the southwest to tropical rainforest in the east, each protected area is a world unto itself with unique problems and possibilities. Therefore, to visit only one of the thirty-nine areas currently enjoying protected areas status would seem inadequate.

But the Integrated Nature Reserve of Andohahela, and the integrated conservation and development project (ICDP) concerned with its protection, do illustrate the evolution of protected areas management in Madagascar as a whole. While other areas may experience different threats and present alternative development possibilities, the progression from a strict preservationist approach to a more comprehensive natural resources management approach is representative of the state of biological diversity protection throughout the country.

II. The Integrated Nature Reserve of Andohahela

A. Biophysical Features

Located in the southeast corner of Madagascar, the Integrated Nature Reserve of Andohahela is significant in that it is the only protected area in Madagascar to encompass the transition between two major biogeographic regions: the rainforest of the Eastern region and the sub-arid, spiny forest of the West. Crossing its three non-contiguous parcels, an east-west transect begins in Madagascar's eastern rainforest, climbs to sub montane forest, descends into the country's dry western side of spiny forest and ends in a transitional forest which is home to a rare species of palm.

Each of the three parcels that make up the reserve has a distinct vegetation type. Vegetation in Parcel 1 is typical of submontane tropical rainforest, of which it constitutes the southernmost extension in Madagascar. Buttressed trees of up to 35m occur, though generally tree height does not exceed 25m. Genera characteristic of this forest type include *Tambourissa, Symphonia* and *Dalbergia*, with members of the families *Lauraceae, Compositaceae* and *Rubiaceae* represented on the higher slopes. The endemic family *Humbertaceae* is found with the reserve. *Orchidaceae* and *Cycathaceae* are common, and the epiphytic cactus *Rhipsalis* also occurs. Epiphytes are abundant, and at higher altitudes mosses and lichens are found.

Parcel 2 consists mainly of spiny thorn forest with some bush and scrub and also some gallery forest along the Menanara River in the northern part of the reserve. The highest hills have no forest cover and are generally covered with tussock grass and other

herbaceous vegetation, with Aloe and *Pachypodium* spp. In the thorn forest, the endemic genera *Alluaudia* and *Didierea* are well represented; one species of the former (A. ascendens) is endemic to the Mandrare region, as is the baobab *Adansonia za*. Species of *Euphorbiaceae*, *Leguminosae* and *Crassulaceae* are also abundant.

Parcel 3 has a high density of the endemic palm *Neodypsis decaryi* and was originally set up specifically to protect this endangered species. It also has a belt of vegetation transitional between the spiny forest and the eastern rain forest. *Leguminosae*, particularly Acacia spp., are well represented as are *Cucurbitaceae* and *Euphorbiaceae*. There is some deciduous forest with Tamarindus indica along one of the non-permanent rivers, the Andehamara, and introduced Eucalyptus has become established along the eastern end of the parcel.

The bird life is abundant, with 50 species present. Five amphibian species appear to be endemic to the Anosyenne Hills (*Anodonthyla rouxae*, *Madecassophryne truebae*, *Microhyla palmata*, *Mantidactylus grandisonae*, and *Boophis microtis*) and probably occur in the reserve. Fifteen lemurs are reported to occur--the greatest number of any Malagasy reserve, including the aye-aye *Daubentonia madagascariensis* (E), woolly lemur *Avahi laniger*, fork-marked lemur *Phaner furcifer*, ring-tailed lemur *Lemur catta*, Verreaux's sifka *Propithecus verreauxi*, and diadem sifaka *P. diadema*. Two lepilemurs, *L. mujstelinus* and *L. leucopus* also occur. At least four, possibly six, carnivores live there, including the fossa *Cryproprocta ferox* and the Malagasy civet *Fossa fossa*.

B. History of the Reserve and Human Influences

Andohahela has a long history as a protected area. Established in 1939, its size was increased from 46,000 ha to 76,020 ha in 1966 making it the third largest protected area in Madagascar. The Environmental Action Plan recognized Andohahela's importance in the conservation of biodiversity in Madagascar by classifying it as a Priority I Protected Area. Like nearly all of Madagascar's protected areas Andohahela has experienced a range of ups and downs of boundary enforcement, benign neglect and incursions into the reserve itself.

The people in the 63 villages surrounding the three parcels engage in a variety of activities that threaten biological diversity conservation in Andohahela. In some of the peripheral zone surrounding the reserve there is no area that can serve as a buffer zone between intensive human activities and the protected area. Basic production activities of slash and burn agriculture and herding both figure prominently right up to the reserve boundaries and occasionally inside the reserve itself. Fires, whether they enter the reserve accidentally or intentionally, have been

development of tourism and to the increase in economic benefits returning to local residents,

5. to develop an effective system of education and biological and social research within the project zone by both students and conservation professionals,
6. to reinforce the capacity of local institutions (both governmental and non-governmental) and village associations to manage natural areas and to promote sustainable conservation and development activities.

APPENDIX D

PERSONS CONTACTED

Washington

Tony Pryor, USAID, AFR/ARTS/FARA
Tim Resch, USAID, AFR/ARTS/FARA
Mike McGahuey, USAID, AFR/ARTS/FARA
Peter Maille, Peace Corps, former Project Manager, Beza Mahafaly
Bob Freitas, Former CTA, Andohahela Project

USAID/Madagascar

Donald Mackenzie, Deputy Director
CJ Rushin-Bell, Environmental Officer
Lisa Gaylord, SAVEM Coordinator
Spike Millington, KEPEM Coordinator
Bill Hammink, PDO

ANGAP/GMU

Raymond Rakontonindrina, Executive Director
Andriamahaly Rasolofo, Monitoring and Evaluation Department
Jacqueline Rakotoarisoa, Training Department
S.N. Ratrimoarisaona, Financial and Administrative Department
Mr. Faustin, Finance and Administration
Roy Hagen, COP SAVEM/ANGAP
Peter Robinson, SAVEM/ANGAP
Rob Solem, SAVEM/GMU/PACT
George Scharffenberger, CDP, SAVEM/GMU/PACT

NGO Operators and others/Antanarivo

Sheila O'Connor, WWF, Program Director
Olivier Langrand, WWF, Assistant Director
Paul Siegel, CTA, WWF Debt/Nature
Johannes Veerkamp, CARE
Patrick Daniels, Conservation International
Leonard Razafindrazaka, SAF-FJKM
Lyn Robinson, CTA Ramanofana Project
Peter Bloch, KEPEM/LTC
Charles Ranaivoson, President, COMODE
William Ramaroharinosy, General Secretary, COMODE
Trésorier Rakotonirina, COMODE

DEBT-for-NATURE

Paul Elliot, National Director of the Debt/Nature Project

Gilbert Rakotondranaivo, Station Chief, Sisaony
Patrice Rabemananjara, APN, Debt/Nature
Andriananivo, APN, Debt for Nature
René Rakotondrasoa , KASTI, Vakivato Village, Sisaony Station

Angavokely Forestry Station

Georges Rakotomanan, DEF/Cantonnement Chief
Gabriel Ramaroson, DEF/Forestry Station Chief
Albert Rakotoniaina, APN Debt/Nature
Fanja Razafimahatratra, APN Debt/Nature

Andohahela Project Staff/Tolagnaro

Mark Fenn, CTA
Lala, Chief of Project
Jonny Ralambo, Sociolingue-Animateur
Evariste, Educator - Environmental Awareness
Loubien Octave Ndriaka, Assistant Educator
Zigzag Randria, DEF/Canton Chief Amboasary-Sud and Chief

Andohahela/WWF

Delmond, Chauffeur
Biberon (Ethno-botaniste)
Mr. Rabemarzaka, DEF/Canton Chief, Tolagnaro
Patrick Bausin, VSF
Patrick Boittin, General Agronomist - Chief of Survey Teams/WWF/VSF

APN/Andohahela

Lambo (Ihazofotsy)
Alexis Mara(Esaka-Evondro)
Rahary (Mandiso)
Monja Tsimahamoky (assistant to Rahary)

NURSERIES/Andohahela

Nataud, Chief Nurseryman
Ian René Manositsy, Esaka-Evondro
Abel Lava, assistant to René and KASTI of Esaka-Evondro

DEF

Rabemanjaka, Canton Chief, Taolañaro
Georges Rakotonarivo, Service Chief, Forest Ecosystems and Fire Control Service

APN/TSITONGAMBARIKA I

Rubin, APN, Tsitongambarika
Tevenot, APN, Tsitongambarika
Thomas, APN, Tsitongambarika

Paul Tata, KASTI, Mangaiky Village

Andohahela Project Survey Teams/Field Staff, Benficiaries

Betanimena Village

Philibert Norovelo, naturalist
André Resambane, geographer
Lalao Voahangy
Eustache Miza
Pascaline Rasoarimanana
Patricia

Ihazoambo Village (survey team)

Noël Razafitiana, geographer
Hanitra Ramanambintana, geographer
Jean Bemahefa, geographer
Lalao Harisoa Claudia Maka, geographer
Zertine, geographer
Célestin Ravloarisoa, naturalist

Villagers

Lahiala, Village Chief, Ihazofotsy
Odile, breeder of 13 years in Ihazoambo
Martial Ihaly

BIBLIOGRAPHY

Andohahela Protected Areas Conservation and Development Project.1993. "Organisation Sociale Traditionnelle et Politico-Administrative." World Wildlife Fund/Madagascar.

Andohahela Protected Areas Conservation and Development Project. 1993. "Structure Socio-Démographique de la Population." World Wildlife Fund/Madagascar.

Andohahela Protected Areas Conservation and Development Project. 1993. "Enquête Agricole - Eminiminy." World Wildlife Fund/Madagascar.

Andohahela Protected Areas Conservation and Development Project. 1993. "Enquête Agricole - Esomony." World Wildlife Fund/Madagascar.

Andohahela Protected Areas Conservation and Development Project. 1993. "Enquête Agricole - Tsimelahy." World Wildlife Fund/Madagascar.

Barbour, Russell, Rene Rabezandria, Ray Davieson, William Guyton, Nivo Rakotobe, Pepe Andrianomanana, Lala Ranajanhery, Paula Williams. 1992. "The Broken Forest: Applying the Integrated Conservation and Development Paradigm to Madagascar's Protected Areas." USAID/Madagascar.

Brandstetter, Robert H. and Peter T. Gilruth. 1992. Debt for Nature Swap Project Evaluation. Washington, DC: World Wildlife Fund.

Brandstetter, Robert H. and Peter T. Gilruth. 1992. Aménagement des Aires Protégées: Andohahela: Evaluation. Washington, DC: World Wildlife Fund.

Brandstetter, Robert H. and Peter T. Gilruth. 1992. Montagne D'Ambre: Integrated Conservation and Development Project. Madagascar. Phase I Evaluation. Washington, DC: World Wildlife Fund.

Brown, Michael and Barbara Wyckoff-Baird. 1992. Designing Integrated Conservation and Development Projects. Washington, DC: The Biodiversity Support Project of World Wildlife Fund, The Nature Conservancy and World Resources Institute.

Durbin, Joanna. 1991. "Local People and Protected Areas: Report of seven weeks fieldwork in villages around Andohahela Strict Nature Reserve (R.N.I. No. 11)." Photocopy.

Durbin, Joanna. 1991. "Local Communities and Protected Areas: Report of two months fieldwork in villages around Andohahela Strict Nature Reserve, April and May 1991." Photocopy.

Gaylord, Lisa, George Scharffenberger, and Chris Seubert. 1993. SAVEM Grants Management Internal Assessment. USAID/Madagascar.

Government of the Republic of Madagascar. 1989. "Environment Program 1, Draft for Comment." Washington, DC: World Bank.

Groenfeldt, David. 1990. The Beavoha Irrigation Project (Beza Mahafaly Reserve, Madagascar): Consultant's Report. Washington, DC: World Wildlife Fund.

Hagen, Roy T. 1991. Masoala Project Evaluation. USAID/Madagascar.

Hannah, Lee. 1992. African People, African Parks: An Evaluation of Development Initiatives as a Means of Improving Protected Area Conservation in Africa. Washington, DC: USAID/Biodiversity Support Program.

Kiss, Agnes (ed.). 1990. Living with Wildlife: Wildlife Resource Management with Local Participation in Africa. World Bank Technical Paper Number 130. Washington, DC: World Bank.

Lanting, Frans. 1990. A World Out of Time Madagascar. New York, NY: Aperture Foundation.

Nicoll, M.E. and O. Langrand. 1989. Madagascar: Revue de la conservation et des aires protégées. Gland, Switzerland: World Wildlife Fund.

O'Conner, S. 1990. "Beza Mahafaly and Andohahela Reserves -- Madagascar." In Living with Wildlife: Wildlife Resource Management with Local Participation in Africa. World Bank Technical Paper Number 130, edited by Agnes Kiss. Washington, DC: World Bank.

Office of Analysis, Research, and Technical Support, Bureau for Africa. 1993. Towards a Sustainable Future for Africa: Improved Natural Resources Management under the Development Fund for Africa, 1987 to 1993. Technical Paper No. 5. Washington, DC: USAID.

Stuart, Simon, Richard Adams, and Mar[illegible]n Jenkins. N.d. Biodiversity in Sub-saharan Africa and its Islands: Conservation, Management, and Sustainable Use. A contribution to the Biodiversity Conservation Strategy Programme. Gland, Switzerland: World Conservation Union.

USAID/Madagascar. 1990. "Sus[illegible]inable Approaches to Viable Environmental Management Project (SAVEM)". Project Paper.

Wells, Michael and Katrina Brandon. 1992. People and Parks: Linking Protected Areas Management with Local Communities. Washington, DC: World Bank.

World Bank, USAID, Coopération Suisse, UNESCO, UNDP, and WWF. 1988. "Madagascar Environmental Action Plan. Volume 1. General Synthesis and Proposed Actions (Preliminary Version)."

World Conservation Union (IUCN). 1991. Protected Areas of the World: A review of national Systems. Volume 3 - Afrotropical. Gland, Switzerland: IUCN.

World Conservation Monitoring Centre. 1991. Guide de la Diversité Biologique de Madagascar. Cambridge, U.K: World Conservation Monitoring Centre.

World Resources Institute (WRI), The World Conservation Union (IUCN) and United Nations Environment Program (UNEP). 1992. Global Biodiversity Strategy. Washington, DC: WRI, IUCN, and UNEP.

World Wildlife Fund/Madagascar. 1993a. "Proposition de Financement de la Phase I Soumise au GMU pour la Collecte de Données de Base, L'Analyse, et la conception du projet. Projet de Conservation et de Développement Intégré pour la Réserve d'Andohahela."

World Wildlife Fund/Madagascar. 1993b. "1992 Project Progress Report: Andohahela Protected Areas Conservation and Development Project."

World Wildlife Fund/Madagascar. 1993c. "Project Progress Report Covering the Period January 1 - June 30, 1993. Andohahela Protected Areas Conservation and Development Project."

P-BIB.MAD05/15/94:fws